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CURIOSITY AND COMPASSION: CURIOSITY AND ATTACHMENT SECURITY'S
RELATIONSHIP WITH EMPATHIC RESPONDING TO HARDSHIP

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science
at Virginia Commonwealth University

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Abstract

CURIOSITY AND COMPASSION: CURIOSITY AND ATTACHMENT SECURITY'S RELATIONSHIP WITH EMPATHIC RESPONDING TO HARDSHIP

By: Athena H. Cairo, B.A.

A thesis prospectus submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University.

Virginia Commonwealth University, 2015

Director: Dr. Jeffrey D. Green
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Compassion requires both attention and motivation to engage with another person's experience. Two studies examined whether curiosity—the interest and motivation to explore new or complex information—promotes empathic concern and suppresses personal distress. These studies also examined whether attachment insecurity moderates curiosity's effect on empathy. Study 1 identified correlations among curiosity, attachment security, empathic concern, and personal distress traits. In Study 2, participants were primed with high or low curiosity before watching a video of a peer experiencing hardship, then reported state curiosity, empathic concern, personal distress, and prosocial motivation. Trait and state curiosity predicted greater empathic concern and prosocial motivation. In Study 1, greater attachment anxiety was shown to weaken trait curiosity's relationship with empathic concern. In Study 2, greater attachment anxiety also weakened the relationship between state curiosity and personal distress. These results suggest curiosity may be a way to promote compassion and willingness to help.

Curiosity and Compassion: Curiosity and Attachment Security's Relationship with Empathic Responding to Hardship

A man enters his Rogerian therapist's office and says, "Doctor, I'm feeling really hopeless and desperate." The therapist, trained to empathetically reflect and unconditionally accept his client's responses, replies, "so, I hear that you're feeling rather hopeless, and at the end of your rope." The client replies by saying: "Yes, Doctor, I really feel I would be better off dead." To which the therapist comments: "You really are at your wit's ends about what to do." The client stands and moves to the window of the office and opening it up, the therapist observes, "You're showing me how much pain you are in; how desperate you are." The client then jumps out the window – the therapist looks out the window for a moment, and warmly says, "Splat" (adapted from Wessler, Hankin, & Stern, 2001).

One important factor in any relationship—particularly one between a therapist and client—is the ability to feel empathy for another person when they are in pain. Despite being acutely aware of what his client was thinking and feeling, the therapist described above is clearly not very compassionate toward his patient's situation. If we define empathy as the process of accurately discerning how another person feels (e.g., "empathic accuracy," Ickes, 1997), then indeed we might consider the therapist's response empathic, if only by the barest sense of the word. However, it would seem that other-oriented compassionate concern for his patient's hardship and emotional distress (i.e., "empathic concern," Batson & Shaw, 1991) is lacking.

One other factor missing from this exchange is curiosity: the desire to attend to, embrace, and seek out new experiences and new knowledge within one's environment (Kashdan et al., 2009); or, the positive emotion stemming from that approach motivation toward novel stimuli (Silvia, 2005). The therapist in our example was essentially correct in identifying how his client

felt based on how the client acted, but did not show any genuine interest in his client's true experience.

Engaged curiosity with another person's emotional experience, rather than a detached reflection, intuitively seems as if it should lead to genuine, other-oriented emotional reactions. This concept has been brought up often in discussions of counseling and doctor-patient relationships in the medical field, suggesting curiosity is a primary motivator of empathic concern for others. For instance, Rogers (1961) described an ideal, empathic relationship as being fostered by a "continuing desire to understand" the other person's unique point of view (p. 34). Halpern (2007) similarly describes *empathic curiosity* as a motivational process that promotes distinguishing one's own experience from another's and seeking to understand the other individual's unique perspective. Furthermore, McEvoy et al. (2013) suggest that adopting empathically curious questions in therapy can have positive effects such as promoting client trust and facilitating communication.

These lines of reasoning suggest that curiosity may facilitate empathic concern in any relationship, particularly those in which the empathizer is in a position to help the other person. Adopting a curious mindset should promote other-oriented emotional responses as well as concerned efforts to understand the other person's point of view, facilitating empathic concern over and above personally-oriented feelings of emotional distress. To examine this possibility, the studies reported here tested the relationship between curiosity and empathic concern or personal distress at both trait and state levels of analysis (see Figures 1 and 2 for conceptual models). These two studies also examined how a relational variable related to both empathy and curiosity—attachment security—may moderate these proposed relationships (see Figures 3-6 for conceptual models).

The following literature review examines what constitutes empathic concern and personal distress in greater detail, and how curiosity is likely to correlate positively with other-oriented concern and negatively correlate with personally-oriented distress. Then, I review the role of attachment security in relational processes and how the two dimensions of insecurity may relate to curiosity, empathic concern, and personal distress. Lastly, I describe how attachment anxiety may moderate the proposed effects of curiosity on empathy indices, such that those high in anxious attachment insecurity should not show a significant relationship between curiosity and either empathic concern or distress.

Empathic Concern and Personal Distress

Research suggests that witnessing another person's pain or need can trigger two qualitatively and physiologically distinct emotions. One response might be an egoic feeling of *personal distress*, characterized in terms of "worried," "disturbed," or "upset." Another might be a response of *empathic concern*, characterized by other-oriented attention and terms like "moved," "compassionate," and "soft-hearted" (Batson, Fultz, & Schoenrade, 1987; Decety & Lamm, 2006; for a review, see Batson, 2011). When assessed together, state empathic concern and personal distress are often positively correlated (e.g., $r = .45$ to $.75$; Batson et al., 1987). However, these emotions carry different implications for emotional reactivity and prosocial motivation.

Feelings of personal distress primarily motivate avoidance from a distressing stimulus. In a situation where escape is easy and there are no other competing motivations to address the distressing problem, personal distress tends to motivate escape behavior. For instance, when faced with another person experiencing pain or need, participants who feel personal distress are less likely to help if they can easily remove themselves from the situation (Batson et al., 1987;

Batson & Shaw, 1991). However, when escape is difficult, personal distress can motivate willingness to help the other person as a way to relieve one's own negative affect. However, helping prompted by personal distress is less voluntary, and in this context helping is contingent more upon the individual thinking they will feel better as a result of the help than upon the welfare of the victim (Cialdini et al., 1987; Cialdini, 1997). Because personal distress motivates attention away from the victim or person experiencing pain, curiosity is likely negatively related to personal distress.

In contrast, feelings of empathic concern seem to be motivated by wanting to ultimately improve the other person's welfare. Participants with higher trait empathic concern or induced empathic concern (via perspective-taking or emotionally-objective framing primes) have been shown to choose helping another person over abandoning the situation (for a review, see Batson et al., 1987; Batson & Shaw, 1991; Batson, 2011).

Feeling empathic concern, rather than personal distress, is thought to be mediated by the two key antecedents of noticing the person's need and valuing their welfare (Batson, 1991; Batson et al., 2007). People must notice others' affective cues when they appear in order to react to them, and people are also less able to feel strong empathic concern under heavy distraction, such as when encountering multiple victims (Dickert & Slovic, 2007). Valuing the person's welfare provides the motivation to be vigilant to the other person's nonverbal and situational cues and intuitively adopt his or her perspective (Batson, Eklund, Chermok, Hoyt, & Ortiz, 2007; Batson, Turk, Shaw, & Klein, 1995). Thus, when individuals are able to garner the mental and emotional resources to fully attend and try to understand another person, and are willing to value the other person's well-being, they are more likely to feel compassionate concern even when they are empathizing with someone in pain. For instance, in the context of helping relationships

between caregivers or practitioners and their clients, greater stress load in clinical settings is predictive of a tendency to experience personally-oriented distress rather than other-focused empathic concern (Thomas, 2013). However, counselors and physicians can learn to engage in empathic behaviors and become better at identifying emotional expressions (Halpern, 2007).

Another factor that may promote empathic concern is the extent to which the empathizer feels psychologically connected or “overlapping” with the other person (Goldman, 1992; Preston & de Waal, 2002; Preston & Hoffman, 2011). Studies using fMRI indicate that seeing another’s pain activates neural regions associated with feeling pain in one’s own body (Hein & Singer, 2008). However, too much self-other overlap can actually be detrimental to empathic concern and perspective-taking fluency. Some findings suggest that adopting a projective cognitive stance (i.e., “imagine that you are the other person”) is more likely to produce personal distress, whereas a more other-oriented stance (i.e., “imagine how the other person feels”) is likely to produce greater empathic concern (Batson, Early, & Salvarani, 1997). When an individual takes a self-perspective while watching another person’s pain, neural pathways for pain are activated and are correlated with personal distress. In contrast, adopting an other-oriented stance elicits less neural pain activation, and subsequently individuals report feeling greater empathic concern (Decety & Lamm, 2006).

Interest in the novelty and unfamiliarity of another person’s experience should facilitate emotional differentiation as well as identification of similarity between oneself and another. High curiosity may therefore promote a beneficial level of self-other overlap and distinction, which in turn may promote empathic concern. Halpern (2007) suggests that the process of empathy requires this genuine empathic curiosity for the other person’s perspective, and further asserts the curiosity component of empathy is what distinguishes engaged empathy (empathic

concern) from what she terms sympathy (emotional contagion or resonance; i.e., simply feeling what the other person feels).

Curiosity and Empathic Concern

Although there is strong theoretical support for a curiosity-empathic concern link, the evidence for this relationship has been mixed. In fact, a few studies seem to suggest there may not be a strong link between curiosity and empathic concern, or that there may be key moderators at play. Acun, Kaprikan, and Kabasakal (2013) conducted one of the few studies directly comparing emotional empathy and curiosity, a validation study of the Turkish translation of the Curiosity and Exploration Inventory-II (a measure of general curiosity and exploration; Kashdan et al., 2009). They found that the CEI-II was negatively correlated with emotional empathy among Turkish participants. One possible explanation is that the emotional empathy measure used, the Basic Empathy Scale (BES; Joliffe & Farrington, 2006), does not distinguish between personal distress and empathic concern emotions. Therefore, the weak negative correlation ($r = -.16$) could be a function of curiosity being positively associated with compassionate concern, and negatively associated with personal distress.

Carroll, Güss, Hutchinson, and Gauler (2012) also found no relationship between curiosity and willingness to spend time with a transgender individual. However, Carroll et al. (2012) used a measure of social curiosity which may tap into personality traits that are at odds with empathy, such as willingness to invade privacy. Carroll et al. (2012) notes that high curiosity could have a detrimental effect on interpersonal relationships, especially those between a practitioner and client, if an individual feels a more self-focused rather than engaged curiosity toward the client. High curiosity without mindful attention to how one's questioning affects the other person would be detrimental to empathic concern if they allow the novelty of the other

person's experience to minimize their focus on expressing emotional support. Thus, it could be that curiosity effects on empathy are moderated by factors which influence attention and cognitive representations of self and other, such as attachment security.

In contrast to Acun et al. (2013) and Carroll et al. (2012), other research does provide evidence in support of the empathic concern-curiosity relationship. In an unpublished doctoral dissertation, Banks (2007) found that trait curiosity and exploration tendencies predicted clinical psychology doctoral students' self-perceived ability to empathize with clients in domains of both perspective-taking and empathic concern. However, Banks (2007) did not measure actual state empathic concern for a victim, and in fact found no support that curiosity actually increases cognitive empathic ability (only perceived empathic ability).

Stronger support for the curiosity-empathy relationship comes from Batson et al. (1991, studies 2 and 3). While curiosity was not directly measured, these studies assessed empathic concern and used a methodology that could have influenced curiosity. Participants watched an interview eliciting sympathy, and were either assigned to stay objective toward the video or to take the perspective of the victim. Participants reported their emotional reactions to the video, as well as whether they wanted to continue watching the current interview or switch to a different video. Participants in the objective-stance (low empathy) condition were less likely to want a follow-up on the victim's condition, except when there was a strong possibility of the victim having recovered. Participants' choice of whether to get more information about the original victim could likely reflect how curious they were about the other person's well-being. One interpretation of the Batson et al. (1991) findings is that situationally-manipulated empathy could promote subsequent increased curiosity. Additionally, the control manipulation to "not let [themselves] get caught up in what the subject is thinking or feeling" may have suppressed

participants' curiosity, which then may have had downstream effects on empathic concern (p. 416). However, because curiosity was not directly measured, additional support is needed to confirm this idea.

In conclusion, the studies which have either attempted to directly investigate emotional empathy and curiosity, or have done so indirectly, do not paint a full picture of whether being more inquisitive predicts greater concern, or whether the concepts are only theoretically related. However, other research identifying links between curiosity and positive social-emotional outcomes do point at several possible mechanisms by which curiosity could likely influence empathic concern, which may suggest the aforementioned findings are spurious or accounted for by other factors. Specifically, the motivational and attentional factors underlying curiosity could also enhance self-other differentiation while guiding attention toward important nonverbal cues about the other person's inner state.

Curiosity and Antecedents to Empathic Concern

Despite the mixed support for a direct link between curiosity and empathic concern, there is stronger evidence to suggest curiosity may promote several antecedents of empathic concern, such as attention to others' needs, heightened valuation of another's welfare, and self-other differentiation. First, curiosity may affect social attention because it modulates attention toward novel or unfamiliar details of a situation. People high in dispositional curiosity generally identify novelty in their environment more readily than non-curious people, and likely due to their repeated exposure to novelty, feel greater confidence in their ability to handle the emotions and thoughts brought about by this information (Silvia, 2005). A highly curious mindset predicts greater psychological flexibility to adjust one's emotions after experiencing something stressful (Kashdan et al., 2013). Thus, highly curious people are better able to modulate their attention

toward external stimuli, especially toward new or unfamiliar information. Furthermore, curiosity can both be evoked reflexively in the face of novel stimuli, as well as engaged in a directed top-down manner (Kashdan et al., 2013). Thus, feelings of curiosity, both intuitive and controlled, seem to motivate differing behavioral patterns as a way to modulate both emotional and cognitive drives.

Supporting this notion, curious people have been shown to be less emotionally reactive and better able to foster positive affect. When faced with novel information that challenges their current worldview, highly curious and mindful people show less defensive reactions than those low in curiosity (Kashdan, Afram, Brown, Birnbeck, & Brvoshanov, 2011). Curious individuals are also better able to replenish their cognitive resources when engaging in novel tasks or learning new information (Thoman, Smith, & Silvia, 2011), and are more willing to pursue personally-interesting goals in spite of stress or tension (Kashdan & Rottenberg, 2010). Individuals higher in trait curiosity are also less aggressive in response to provocation across different social interactions (Kashdan et al., 2013) and generate greater positive associations and feelings of closeness during initial encounters with strangers (Kashdan, McKnight, Fincham, & Rose, 2011). Finally, those higher in curiosity tend to feel more positive affect and less negative affect throughout social interactions (Kashdan & Roberts, 2004; 2006), and other people tend to consider the highly curious as more inviting and attractive (Kashdan & Roberts, 2004).

Finally there is some evidence that people who are more empathic are more curious and motivated to seek out novel empathic experiences. Smith (1992) found that individuals high in dispositional empathic concern reported a greater preference for engaging in psychology studies that would likely produce feelings of compassion, compared to those low in empathic concern traits. Additionally, Davis and colleagues (1999) found that dispositional empathic concern was

correlated with an increased preference for choosing to volunteer in sympathy-inducing settings, but not distress-arousing or neutral volunteer settings. If curiosity facilitates greater empathic concern, it makes sense that people who tend to feel empathic concern would display greater curiosity toward empathic stimuli as well. This may also be indicative of a bidirectional relationship between curiosity and empathy, and the two constructs dynamically promote each other in social interactions.

The Present Research: Curiosity Effects on Empathy

Given the theoretical support underlying curiosity's effects on positive interpersonal functioning, it would be of use to researchers and practitioners to understand to what extent fostering curiosity can promote prosocial empathic responding. Findings by Batson et al. (2007) suggest that perspective-taking only partially mediates the relationship between valuing the other's welfare and empathic concern, suggesting that even if curiosity does not predict greater empathic accuracy through more accurate perspective taking (e.g., Banks, 2007), curiosity could still viably induce empathic concern and reduce tendencies to feel personal distress through increasing attention and valuation of the other's needs (see Figures 1 and 2 for representations of these proposed relationships). The studies reported here are among the first to directly measure curiosity's effect on empathic concern and personal distress, and the first to my knowledge to do so in an experimental context.

Specifically, these two studies tested the following primary hypotheses:

Hypothesis 1 (Study 1). Trait curiosity (both social curiosity and general curiosity) will be significantly positively correlated with trait empathic concern, but negatively correlated with trait personal distress.

Hypothesis 2 (Study 2). Higher state curiosity (induced through a curiosity manipulation) will predict significantly greater empathic concern, and significantly lower personal distress in response to hearing a sympathy-inducing story.

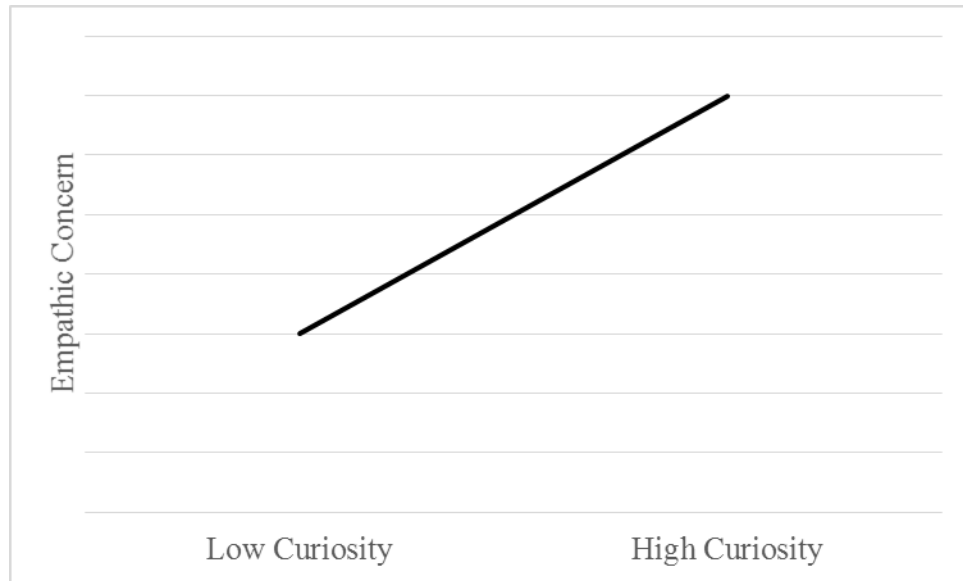


Figure 1. Proposed relationship between curiosity and state or trait empathic concern.

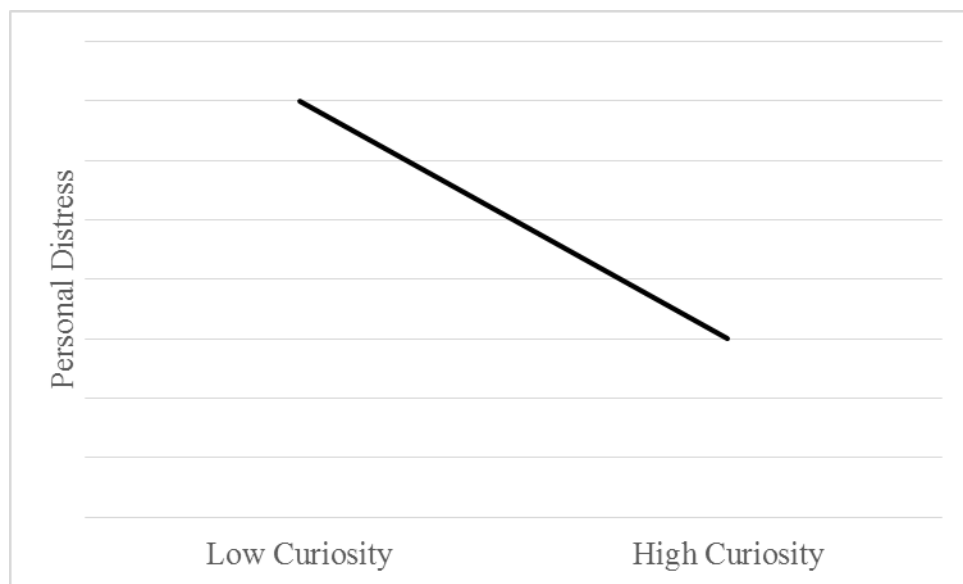


Figure 2. Proposed relationship between curiosity and state or trait personal distress.

Attachment Security and Relational Behaviors

One prominent individual difference that may influence both curiosity and empathic concern is *attachment security*. Bowlby (1969) asserted that the attachment system develops as a mechanism to elicit nurturing responses from a caregiver and maintain his or her presence to assure safety. To this end, infants engage in innate attachment behaviors (crying, clinging, following) during the first few months toward any potential caregiver, then focus their efforts toward those who can serve as attachment figures: specific close others whom they particularly depend on (Ainsworth, 1973).

Early research on infant-mother interactions by Ainsworth and others found that infants typically develop one of several different attachment orientations. Ainsworth and Wittig (1969) developed a paradigm to assess infant reactions to caregiver separation, called the Strange Situation, which assessed how an infant reacted to a separation from their caregiver in an unfamiliar environment as well as their reaction toward the caregiver upon his or her return. This design ultimately provided evidence toward distinct, reliable profiles of infant attachment behavior (Bowlby & Ainsworth, 1991). Initially, three general categories of behavior were identified. The majority of children became distressed when separated from their caregiver in the laboratory, but showed joy and approach-oriented responding toward his/her upon her return. These children were classified as *secure*. Children with a secure attachment style, compared to less secure infants, generally cried less frequently and were more likely to explore their surroundings when in the proximity of their caregiver. In contrast, a smaller percentage of children showed distress upon their caregiver's exit, but clinginess, hostility, and grumpiness upon his/her return; these children were categorized *anxious-ambivalent*. A third subgroup of infants categorized as *avoidant* showed little externalized distress toward the caregiver's

separation, and ignored caregivers after separation (see Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby & Ainsworth, 1991 for reviews).

The attachment system fosters these different behavioral styles in complement with the type of caregiving and nurturance that an infant learns to expect from their attachment figures (Bowlby, 1973; Gilliath & Shaver, 2005). For instance, observational data of children in their home environments as well as the Strange Situation laboratory environment, indicated that infants whose caregivers responded inconsistently or abruptly to the infants' attachment behaviors often were later identified as insecurely attached to their mother. In contrast, infants who were given attentive, positive, consistent care from their mothers were most likely to be later identified as securely-attached (Blehar, Lieberman, & Ainsworth, 1977).

These patterns of interaction lay the groundwork for an infant's working models of others and scripts for what to expect from close others in relationships. Infants who develop secure attachments with their caregivers develop a working model of the caregiver as someone who is available, supportive, and helpful in achieving personal goals. In addition, infants with supportive, consistent caregivers develop a secure-base script which posits that when infants are distressed, they can call out to their caregiver and confidently expect him or her to be available and supportive to their needs, ultimately helping them down-regulate their attachment system (Shaver & Mikulincer, 2012). In contrast, children whose caregivers are unavailable or unsupportive do not develop a strong secure base script, and rather rely on secondary strategies of deactivation or excessive protest for regulating their attachment system (Main, 1990). An infant who comes to learn that his or her caregiver will be unavailable or angry at his cries for attention will eventually stop seeking care, and instead develop self-soothing strategies to escape negative affect and pain. These deactivation strategies serve to stifle the attachment system and

the feelings of need for intimacy, and often are characteristic of avoidant children. Children whose caregiver is inconsistently available learn that consistent, excessive protest is a more effective strategy for eliciting and maintaining affection and care. These hyperactivating strategies, more often utilized by insecurely-attached individuals, exaggerate cues about the caregiver's unavailability and the child's desire for attention (Cassidy, 2000; Main, 1990; Shaver & Mikulincer, 2012).

Bowlby (1988) believed attachment styles manifest and affect relationships throughout life, through proximity-seeking thoughts and behaviors in times of distress. In support of this, ample research on adult attachment styles suggests enduring effects of attachment orientation on social cognition, affect and interpersonal behavior throughout life. One of the first measures of adolescent and adult attachment identified patterns in individuals' memories and descriptions of their parents, and categorized as to their overall attachment security, as well as the extent to which they engaged in hyperactivating or deactivating attachment arousal strategies (George, Kaplan, & Main, 1985, as cited in van IJzendoorn, 1995). Notably, adults' attachment classifications according to the AAI have been shown to significantly predict their child's attachment security (van IJzendoorn, 1995). However, whereas an infant's attachment figure is his or her primary caregiver, in adulthood romantic partners often act as primary caregivers (Mikulincer, 2006). Hazan and Shaver (1987) were the first to publish a self-report measure of adult attachment security in terms of attachment to a romantic partner using the same dimensions of secure/anxious/avoidant identified from the Strange Situation paradigm. Young adults self-reported how well a paragraph describing securely-attached ("I find it relatively easy to get close to others..."), anxious-ambivalent ("I feel that others are reluctant to get as close as I would like..."), or avoidant ("I am somewhat uncomfortable being close to others...") attitudes and

thoughts reflected their perspectives toward relationships. Hazan and Shaver (1987) found that slightly more than half of all respondents could be categorized as secure, about 25% as avoidant, and about 20% as anxious-ambivalent. Consistent with infant attachment theory, they also found that individuals coded as secure reported warmer relationships with their mothers and fathers, compared to insecure adult participants.

Over two decades of subsequent research on adult attachment styles highlights striking consistencies in attachment's effects on cognition, emotion, and behavior from childhood to adulthood. More securely-attached teenagers have been shown to be significantly less likely to engage in avoidance behavior when interacting with their parents (Kobak, Cole, Ferenz-Gillies, Fleming, & Gamble, 1993) and securely-attached adults tend to report positive perceptions of their familial relationships (Feeney & Noller, 1990). In contrast, individuals whose parents adopted anxious-ambivalent parenting styles report greater anxiety, distress, and reluctance to depend on others (Collins & Read, 1990) and anxious-ambivalent adults report decreased self-compassion and subjective well-being compared to more securely-attached individuals (Wei, Liao, Ku, & Shaffer, 2011). Avoidant adults, like infants, are less likely to seek help from others (Fraley & Shaver, 1997) are less attentive and accepting of emotional distress (Fuendeling, 1998), and have lower emotional well-being than more securely-attached adults (Wei et al., 2011).

Attachment and Curiosity

Attachment security is closely linked to information-seeking tendencies and subjective feelings of curiosity toward different stimuli. One important role the attachment figure plays in an infant's life is that of a secure base. As the infant begins to associate the caregiver's presence with security, and develops a working model the caregiver's availability, the infant will view a

caregiver as a safe base around whom she or he feels comfortable exploring and engaging with the surroundings (Ainsworth et al., 1978; Bowlby, 1973). Secure infants develop clear working models of their caregivers as available in times of need, and so are less preoccupied with making sure their caregiver is around when exploring a new environment.

In adult relationships, attachment security is also associated with differing information-seeking strategies and curiosity toward others. Adults' typical exploratory behavior has been operationalized in terms of work pursuits (Hazan & Shaver, 1990), leisure activities (Carnelly & Ruscher, 2000), meditative exploration (Coy, Green, & Davis, 2012), and willingness to explore new information and experiences across environmental, intellectual, and social domains (Green & Campbell, 2000; Mikulincer, 1997). Individuals who report secure attachment styles self-report higher dispositional curiosity and desire to explore (Green & Campbell, 2000; Mikulincer, 1997). Secure individuals report less fear of failure at their work (Hazan & Shaver, 1990) and less fear of possible repercussions of being curious in social interactions and discomfort toward new perspectives of information (Mikulincer, 1997).

Anxious and avoidant attachment insecurity may be distinctly related to curiosity. In line with reasoning that avoidant attachment fosters deactivating attachment strategies, and anxious attachment promotes hyperactivation strategies in the face of stress (Shaver & Mikulincer, 2012), anxiety and avoidance have predicted contrasting attitudes and behavioral tendencies toward different dimensions of curiosity. Those who are highly avoidant are more easily able to suppress unwanted thoughts about close others (Fraley & Shaver, 1997) and report feeling overstimulated and wanting to withdraw from curious social experiences (Mikulincer, 1997). Attachment avoidance has also been negatively related to social exploration interest, but unrelated to interest in intellectual exploration (Green & Campbell, 2000). Avoidant individuals generally spend

more time exploring when they are alone. For instance, avoidant individuals are more likely to engage in work as a way to escape from romantic relationships (Hazan & Shaver, 1990), and have been shown to spend more time engaging in a meditative exploration task when alone than with a partner (Coy et al. 2012). This suggests that in situations when there is novel information to explore, avoidant individuals will engage deactivating cognitive and emotional strategies in the presence of a social partner. In cases where an individual is experiencing social and emotional pain, avoidant attachment should also engage deactivating strategies and decrease curiosity.

In contrast, anxiously-attached adults report greater worry over finding out distressing information about another person. Anxious individuals may be more likely to stereotype others and be personally distressed and self-oriented, but could also be more curious about others as part of a hyperactivating attachment strategy (Mikulincer, 1997). Anxious attachment has been found to be unrelated to social exploration interest (Green & Campbell, 2000). However, anxious individuals' desire to explore also seems to be fostered by the presence of a social partner, just as avoidant individuals' exploration interest is buffered by partner presence (Coy et al., 2012).

Taken together, these results suggest that in general, an insecure attachment style predicts less willingness to explore one's surroundings and feel curious about information. This may be because both hyperactivating and deactivating regulatory styles orient information search toward best regulating one's attachment-related stress. An anxious attachment predisposes individuals to be more curious about other people, but excessively sensitive to relational distress and information which could harm their relationship. Individuals with more avoidant attachment styles will be more likely to be more cognitively inhibited in a social context, in order to avoid engaging with others and possibly becoming vulnerable. Because attachment modulates this

approach toward curiosity and exploration, we may find that individual differences in attachment security also have implications not only for one's tendency to feel curiosity in social situations, but also for how curiosity might influence empathic concern.

Attachment and Empathic Concern vs. Personal Distress

Alongside the attachment system, Bowlby (1973) also described a caregiving behavioral system which serves to attend to the needs of dependent others, particularly children. The caregiving system complements the attachment system by providing support to others in response to their attachment-seeking cues (Gilliath & Shaver, 2005). Working models of self and other that are developed through attachment system regulation thus include representations both of effective caregiving as well as care-seeking (Kunce & Shaver, 1994). Some researchers have suggested that empathic concern is the driving motivation force behind the caregiving behavioral system, and has evolved as a mechanism to care for offspring (Batson, Lishner, Cook, & Sawyer, 2005; Mikulincer, 2006; Preston, 2013). Batson and colleagues (2005) found that undergraduate participants felt more empathic concern for a fictional character if she was portrayed as a child or a dog than if she was portrayed as a college student, suggesting that compassionate concern is contingent upon a drive to care for and protect another person, more so even than similarity.

Research suggests that the caregiving system is also influenced by the attachment system, such that attachment security modulates both the feeling of concern toward another person, as well as the extent and quality of one's care and helping. Hyperactivation and deactivation of the attachment system can thus have similar influences on the caregiving system as they do on the attachment system. Attachment hyperactivation can exaggerate one's interpretations of others' care-seeking cues, and prompts intrusive and controlling attempts to help the other person. As one might expect, hyperactivation is coupled with heightened feelings of personal distress and

anxiety while attending to another's needs. In contrast, deactivation of the caregiving system predicts a motivation to seek greater interpersonal distance, decreased sensitivity to others' needs, and suppression of empathic concern and personal distress responses (Mikulincer, 2006). In other words, one's global attachment security should not only influence one's tendency to seek out new information and explore, but also should serve to promote or inhibit empathic concern for others who are in need.

In support of this idea, attachment research has highlighted strong, consistent relationships between attachment security and empathic responding. In infancy, attachment security positively predicts later-developing empathic concern (Murphy & Laible, 2013). In adulthood, secure attachment (both global and primed) continues to promote higher empathic concern, and lower personal distress, in response to others' needs than insecure attachment (Britton & Fuendeling, 2005; Joireman, Needham, & Cummings, 2001; Mikulincer et al., 2001; Mikulincer, Shaver, Gilliath, & Nitzberg, 2005). Reflecting a more other-oriented focus on the individual's needs and experience, secure attachment predicts greater motivation to help an individual over a group of people (Robinson, Joel, & Plaks, 2015), altruistic rather than egoistic motivation to help others (Mikulincer et al., 2005) and greater dispositional perspective-taking (Joireman et al., 2001).

Across studies, it has generally been found that higher anxious attachment (dispositional or primed) predicts heightened feelings of personal distress and anxiety when finding out about another person in need (Britton & Fuendeling, 2005; Joireman et al., 2005; Lamport & Turner, 2014; Mikulincer et al., 2001; Westmaas & Silver, 2001). In contrast, attachment anxiety has been shown to either negatively predict empathic concern (Mikulincer et al., 2001) or be statistically unrelated to empathic concern (Burnette, Davis, Green, Worthington, & Bradfield,

2009; Joireman et al., 2001; Robinson et al., 2015; Wayment, 2006). Many studies similarly find that avoidant attachment significantly predicts lower empathic concern and personal distress in response to another person's suffering or need (Burnette et al., 2009; Joireman et al., 2001; Mikulincer et al., 2001; 2005; Wayment, 2006). Avoidance also has been shown to predict decreased tendencies to explore the lives of fictional characters (Britton & Fuendeling, 2005) and supportive behavior in social interactions (Westmaas & Silver, 2001).

More substantial evidence for these effects comes from a small unpublished meta-analysis of nine articles (14 effect sizes) which investigated relationships between romantic attachment insecurity and empathic concern or distress. From this analysis I found that there was a significant negative relationship reported across samples between attachment avoidance and empathic concern ($\rho = -.24, p < .001$), as well as a negative but weaker relationship between attachment anxiety and empathic concern ($\rho = -.14, p < .001$). In contrast, personal distress was significantly positively related to attachment anxiety ($\rho = .23, p < .001$), but unrelated to attachment avoidance ($\rho = .05, p < .001$). In general, it seems that attachment anxiety and avoidance exert contrasting effects on personal distress and empathic concern toward others – anxiety generally predicts higher distress and lower concern, whereas avoidance is unrelated to distress and predicts lower compassionate concern (Cairo, 2014).

If attachment significantly affects tendencies to become curious about others, then we might also expect that attachment security moderates the relationship between curiosity and empathy. This may be particularly the case if attachment anxiety and avoidance predict different levels of curiosity in different situations, and promote interest in different types of information (Green & Campbell, 2000; Mikulincer, 1997). Greater curiosity among those with secure attachment styles might further promote compassionate responding in the face of another's need.

Higher curiosity among those with greater anxious attachment, on the other hand, might promote intrusiveness and less sensitivity toward another's experience which would likely predict greater feelings of personal distress, and less empathic concern. Thus, in highly-anxious individuals, curiosity should not predict empathic concern. Avoidant individuals may feel curiosity toward another person, but are more likely to disengage when they feel they are unable to effectively help (Mikulincer, 1999). Thus avoidant individuals likely feel less curiosity and less empathic concern overall, but when they do feel curious, it is expected to predict greater empathic concern similarly to the general population.

Specifically, when analyzing relationships between attachment insecurity, curiosity, and empathy, strong attachment anxiety should moderate the relationship between curiosity and personal distress, such that the curiosity/empathy relationship would be present in those low in anxiety, but not present among those high in anxiety. Attachment anxiety positively predicts greater personal distress across situations, but is generally unrelated to social curiosity. We should find that those who are high in attachment anxiety should show no relationship between personal distress and curiosity, whereas those low in attachment anxiety should show a strong negative relationship between personal distress and curiosity (see Figure 3 for model). We may also see that the relationship between curiosity and empathic concern is weakened – if anxious attachment is weakly negatively correlated with empathic concern, it could be that anxiety hinders empathic concern in situations of high cognitive or emotional arousal. Therefore, we could find that those who are high in anxious attachment insecurity will show a weaker relationship between curiosity and empathic concern, whereas those low in attachment anxiety will show a strong relationship between curiosity and empathic concern (see Figure 4).

In contrast, attachment avoidance should not moderate the effects of curiosity on emotional empathy. Because avoidance is unrelated to personal distress, those high in avoidance should only show decreased curiosity, but no difference in the curiosity/personal distress relationship compared to those low in avoidance (see Figure 5). Because avoidance is negatively predictive of empathic concern as well as curiosity, we should see that those high in attachment avoidance also show a similar relationship between curiosity and empathic concern as those low in attachment avoidance (see Figure 6).

The Present Research: Attachment as a Moderator of the Curiosity-Empathy Relationship

The studies described here attempt to provide empirical support for the idea that curiosity promotes empathic concern. These studies are also the first of my knowledge to have investigated whether attachment security could be a notable moderator of how curiosity influences empathy. Specifically, these studies tested the following hypotheses:

Hypothesis 3a. Attachment avoidance is negatively related to curiosity

Hypothesis 3b. Attachment avoidance and anxiety negatively relates to empathic concern.

Hypothesis 3c. Attachment anxiety positively relates to personal distress, whereas attachment avoidance will be negatively related to personal distress.

Hypothesis 3d. Attachment anxiety moderates the relationship between curiosity and empathic concern and personal distress, such that those high in anxious attachment should show a weaker association between curiosity and empathic concern/personal distress compared to those low in attachment anxiety.

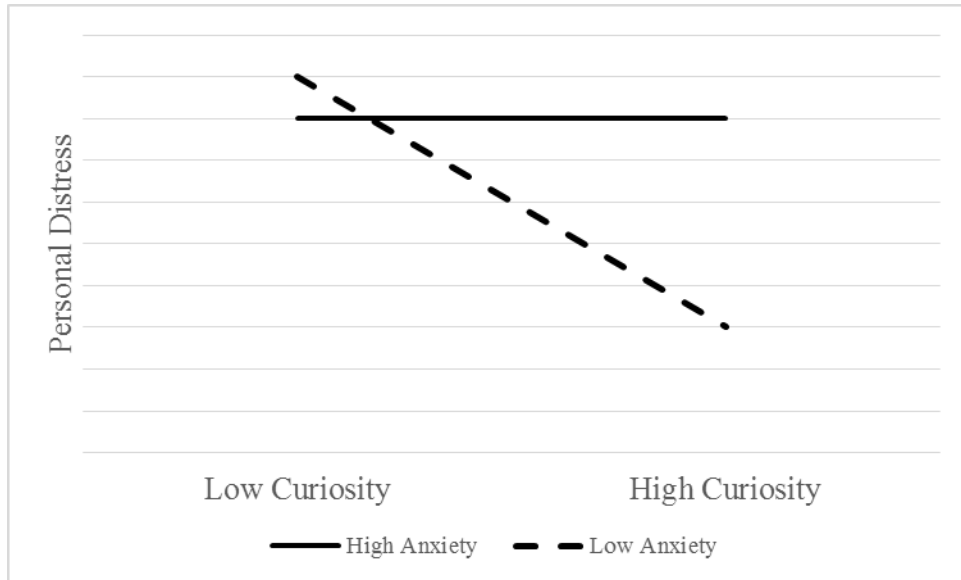


Figure 3. Proposed moderating effects of attachment anxiety on the relationship between curiosity and personal distress.

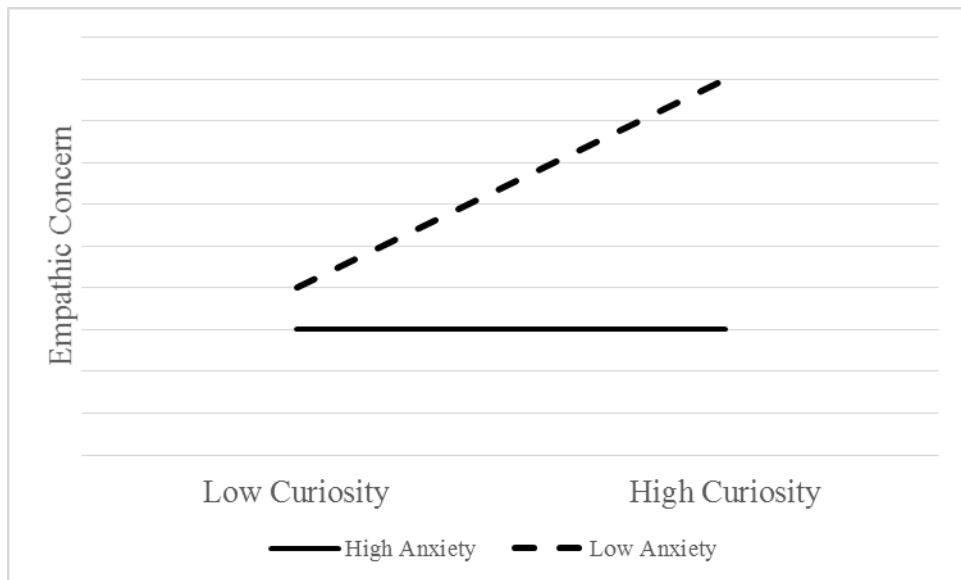


Figure 4. Proposed moderating effects of attachment anxiety on the relationship between curiosity and empathic concern.

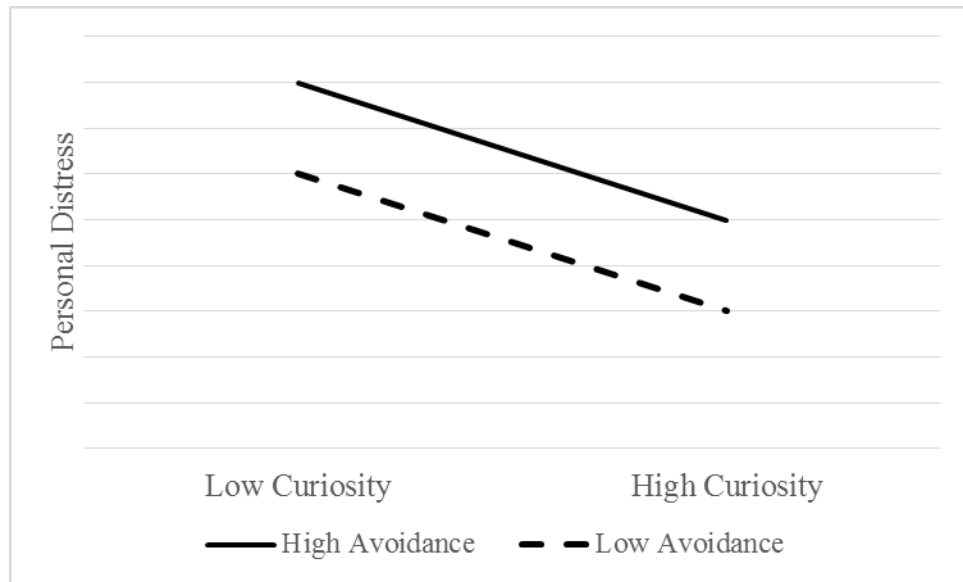


Figure 5. Proposed effects of attachment avoidance on the relationship between curiosity and personal distress.

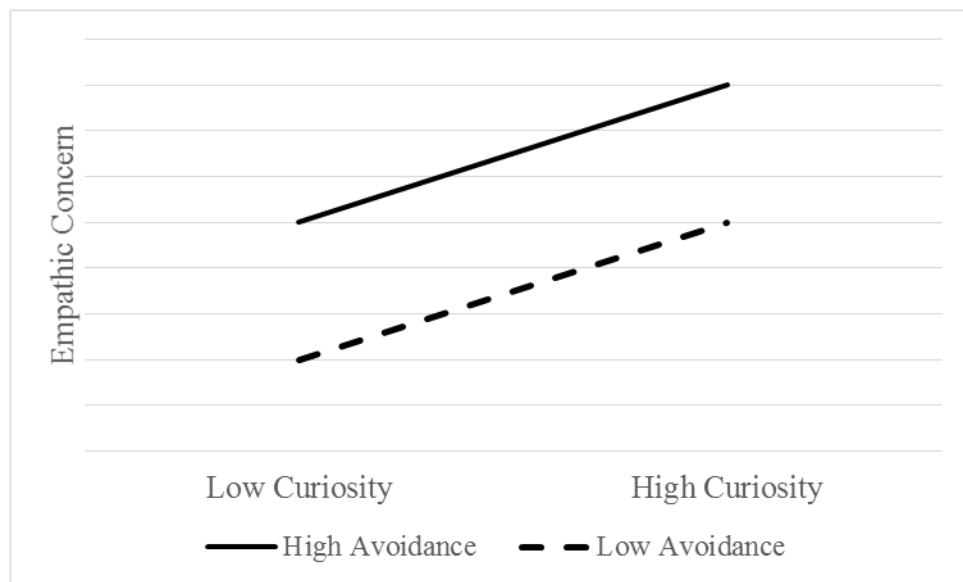


Figure 6. Proposed effects of attachment avoidance on the relationship between curiosity and empathic concern.

Study 1 Method

Study 1 identified relationships between trait indices of curiosity, empathy, and attachment security. This survey study attempted to replicate and extend the preliminary findings of Acun et al. (2013) by asking participants to self-report their empathic tendencies on a scale

that delineates empathic concern and personal distress tendencies, rather than the broader emotional empathy dimension measured by the BES.

Participants

A total of 201 undergraduate college students attending Virginia Commonwealth University participated for course credit. Twenty-one participants were eliminated from analyses due to failing attention checks, leaving 180 participants in the final dataset. Participants were 68.9% female, 31.1% male, and were 18-39 years old ($M = 19.56$, $SD = 2.28$). Participants were 46.1% Caucasian, 20% African-American/Black, 14.4% Asian, 6.2% Hispanic/Latino, 4.5% Pacific Islander, and 8.4% Mixed Race/Other.

Regarding the choice for sample size, prior research indicates a high correlation between trait curiosity measured by the CEI-II and positive relations (measured as a factor of the Psychological Well-Being Scale), which had an effect size of $f^2 = .12$ ($R^2 = .11$; Kashdan et al., 2009). Using the effect size reported in Kashdan et al. (2009) of the relationship between positive social relationship functioning and trait curiosity as a proxy for empathic concern and prosocial warmth tendencies, a power analysis using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) indicated that 96 participants would be needed to detect a similar effect size in a multiple regression assessing up to three predictors (curiosity, anxious attachment insecurity, and an anxiety*curiosity interaction term) with seven possible control variables (behavioral inhibition, behavioral reward seeking, behavioral drive, behavioral fun-seeking, openness, agreeableness, and mindfulness), $\alpha = .05$, $\beta = .80$. Although only 96 participants were required, online participation during the two weeks that the study was available was much higher than anticipated, resulting in approximately two times the target sample.

Design

Study 1 utilized a cross-sectional correlational design to assess relationships among self-reported trait curiosity, emotional and cognitive empathy, Big Five personality characteristics (openness to experience, agreeableness, neuroticism, conscientiousness, and extroversion), behavioral inhibition/activation, mindfulness and attachment security.

Procedure

After obtaining approval of study procedures by the Virginia Commonwealth University Institutional Review Board, participants were recruited using an online portal (SONA Research Participation) to take part in an online survey. After giving their informed consent through an electronic signature, participants completed an online questionnaire through an electronic survey program (REDCap, Harris et al., 2009). After completing these measures (described below) participants read a debriefing letter detailing the study's purpose.

Curiosity and Exploration Inventory-II (CEI-II, Kashdan et al., 2009). Trait non-specific curiosity was measured by the CEI-II, a 10-item self-report scale assessing broad dimensions of trait curiosity reflecting a propensity for seeking, recognizing, and embracing novel information and experiences (Kashdan et al., 2009). Items are scored on a 1 (*Very slight or not at all*) to 5 (*Extremely*) Likert scale. The CEI-II includes two specific factors: Stretching, the tendency to actively seek opportunities to encounter new information (e.g., “I am at my best when I am doing something that is complex or challenging”); and Embracing, the willingness to embrace uncertain or novel experiences in life (e.g., “I am the type of person who really enjoys the uncertainty of everyday life”). The CEI-II was developed from the initial CEI (Kashdan, Rose, & Fincham, 2004), which included items related to exploration and absorption in novel

information, but was lacking in ability to address willingness to manage tension arising from confronting new situations (Kashdan et al., 2009).

The scale demonstrated strong internal reliability in Kashdan et al.'s (2009) initial report with acceptable internal reliability. Further analyses have found similar internal reliability (Karwowski, 2012), as well as strong temporal reliability (Kashdan et al., 2013). Item response theory analysis indicated that the CEI-II most reliably measures scores at the midpoint of the scale, suggesting the scale useful in measuring typical curiosity scores of undergraduate populations (Kashdan et al., 2009, Study 4). The CEI-II has also shown strong construct validity with other measures related to willingness to explore and embrace novel information, positively correlating with personal growth motivation (Kashdan et al., 2009, Study 2), creativity (Karwowski, 2012), and openness to experience and extraversion (Kashdan et al., 2009, Study 3). In Study 1 the CEI-II and its subscales had high internal reliability ($\alpha_{\text{total}} = .88$; $\alpha_{\text{stretching}} = .81$; $\alpha_{\text{embracing}} = .76$).

Social Curiosity Scale (SCS, Renner, 2006). Trait social curiosity was measured by the SCS, a 14-item self-report scale measuring curiosity about information related to other people on a four-point scale (1 = *Strongly disagree* and 4 = *Strongly agree*). Renner (2006) provided principal axis and confirmatory factor analysis support for a two-subscale model. The first subscale, Generalized Social Curiosity, reflects generalized curiosity toward other people's habits, thoughts, and feelings (SCS-G; e.g., "when I meet a new person, I am interested in learning more about him/her"). The second subscale, Covert Social Curiosity, reflects a desire to learn more about personal information or to seek out information surreptitiously (SCS-C; e.g., "when on the train, I like listening to other people's conversations"). Initial validation of the

scale demonstrated strong internal reliability, as did both subscales (Renner, 2006; Hartung & Renner, 2011).

Initial convergent and divergent validation of the SCS indicated the General subscale of the measure is correlated with seeking more positive, direct social interactions. For instance, it shows positive correlations with extroversion and self-reported sociability, popularity, and self-esteem. The Covert subscale is associated with higher neuroticism and social anxiety, supporting the notion that people may still experience curiosity and seek novel information when feeling anxious or upset, but that this cognitive engagement may take a more passive or surreptitious form (Renner, 2006). Individuals scoring highly on general SCS are also more accurate in evaluating the openness and extraverted personality traits of their social partners (Hartung & Renner, 2011).

Compared to the CEI-II, the SCS measures more passive or neutral information-seeking tendencies (e.g., “Other people’s stories interest me”), rather than emphasizing the challenging and exploratory nature of curiosity (e.g., CEI-II Stretching: “I view challenging situations as an opportunity to grow and learn”). While the SCS was positively correlated with the CEI, confirmatory factor analyses indicated that a model differentiating social curiosity from other trait curiosity scales (the CEI, the Epistemic Curiosity Scale) showed a more robust fit than a model combining all curiosity dimensions onto a single curiosity factor (Renner, 2006). This indicates the measure is conceptually different from the CEI. In Study 1, the SCS total scale and General subscale had adequate inter-item reliability ($\alpha_{\text{total}} = .84$; $\alpha_{\text{general}} = .71$) but the Covert subscale had a slightly lower than ideal reliability coefficient ($\alpha_{\text{covert}} = .60$).

Experiences in Close Relationships - Revised (ECR-R; Fraley, Waller, & Brennan, 2000). Attachment security was measured by the ECR-R, a 36-item self-report questionnaire

measuring attachment security to a romantic partner. The measure is scored on a 1 (*Strongly disagree*) to 7 (*Strongly agree*) Likert scale. The measure includes two subscales: Anxiety (18 items, e.g., “I’m afraid I will lose my partner’s love”) and Avoidance (18 items; e.g., “I prefer not to show a partner how I feel deep down”). Low scores on both the Anxiety and Avoidance subscales indicate high attachment security. The ECR-R was developed from the basis of Brennan et al.’s (1998) original Experiences in Close Relationships measure (ECR), after it was discovered that the ECR, as well as other self-report attachment questionnaires, were not consistently precise. Initial test development found strong test-retest reliability and construct validity. In Study 1, both the Anxious and Avoidant subscales of the ECR-R had high inter-item reliability ($\alpha_{\text{anxious}} = .94$; $\alpha_{\text{avoidant}} = .90$).

Mindful Attention and Awareness (MAAS; Brown & Ryan, 2003). As an exploratory question, I assessed individuals’ dispositional mindfulness alongside other dependent and independent measures through the MAAS. The MAAS is a 15-item measuring one’s tendency to attend to their present thoughts, emotions, behaviors, and physical/social environment. Low mindfulness reflects tendencies to forget what one is presently doing, hold preoccupations with the past or future, or act “on automatic.” Each item is rated using a 1 (*Almost always*) to 6 (*Almost never*) Likert scale. The items are negatively-construed (e.g., “I forget a person’s name almost as soon as I’ve been told it for the first time”), as during test construction it was noted that positive endorsements of mindful attention and awareness might be more subject to self-serving evaluative biases (Brown & Ryan, 2003). Brown and Ryan (2003) found that the measure has high internal consistency, and found moderate to strong convergent and divergent validity for the measure in both undergraduate and adult samples. In Study 1 the MAAS had high internal reliability, ($\alpha = .91$).

Behavioral Inhibition/Activation Scale (BIS/BAS; Carver & White, 1994). Approach and avoidance motivation was also measured as an exploratory control variable by the BIS/BAS. The BIS/BAS is a 20-item self-report scale measuring the sensitivity of behavioral inhibition regulation systems (BIS) and behavioral activation systems (BAS). The BIS regulates avoidance-motivated behaviors, and is generally related to negative affect; the BAS regulate sensitivity to punishment as a motivation and tendency engage in avoidance-oriented behaviors. The BAS reflects sensitivity to rewards and tendencies to engage in approach-oriented behaviors. Items are reported on a 1 (*Strongly agree*) to 4 (*Strongly disagree*) Likert scale. The measure includes four subscales. The BIS (7 items; e.g. “I worry about making mistakes”) reflects sensitivity to and anticipation of punishment. The BAS Reward Responsiveness subscale (5 items; e.g., “When I get something I want, I feel excited and energized”) measures positive responses to the anticipation of or receipt of rewards. The BAS Drive subscale (4 items; e.g., I go out of my way to get things I want”) measures the tendency to pursue desired goals. The BAS Fun Seeking subscale (4 items; e.g., “I crave excitement and new situations”) reflects an individual’s desire for new rewards and willingness to engage in potentially-rewarding events. Initial test development indicated adequate inter-item reliability for all subscales except Fun Seeking ($\alpha < .70$) and moderate test-re-test reliability (α ’s between .59 and .69; Carver & White, 1994).

BIS/BAS sensitivity was measured as a possible control variable to identify whether curiosity uniquely predicts empathy over and above general approach/avoidance motivation. There is reason to believe curiosity is beneficial to empathy beyond these systems, as it facilitates seeking out and positively framing novel and uncertain situations in particular. Often, emergency situations elicit feelings of uncertainty (Latané & Darley, 1969), and curiosity may promote approaching uncertainty rather than avoiding it. Furthermore, Kashdan and Roberts

(2006) found that trait curiosity predicted greater positive affect during social interactions than behavioral approach motivation (measured through the total BAS scale of the BIS/BAS) when both were entered as variables in a regression analysis, suggesting that curiosity's drive to seek out unfamiliar, challenging, or novel information may affect emotionality differently than general approach motivation. In Study 1 the BIS ($\alpha = .78$), BAS Drive ($\alpha = .78$), and BAS Reward Responsiveness subscales ($\alpha = .73$) all had adequate internal reliability. However, BAS Fun Seeking subscale had slightly lower internal reliability than ideal ($\alpha = .67$).

The Big-Five Inventory (BFI; John & Srivastava, 1999). The BFI will be used to assess personality indices, particularly agreeableness and openness to experience. The BFI includes 44 items measuring five reliable domains of personality: (extraversion, neuroticism, agreeableness, conscientiousness and openness) by asking respondents to indicate how much each of the statements describes them on a five-point scale (1 = *Disagree strongly* and 5 = *Agree strongly*) Likert scale (e.g., "I see myself as someone who is talkative"; extraverted).

Extraversion refers dimensions of gregariousness, desire to interact socially, and energy.

Agreeableness refers dimensions of tendencies to be sympathetic, forgiving, and humble.

Conscientiousness refers to personal levels of self-discipline, organization, and competence.

Openness refers to facets of artistic propensity, breadth of interests, and conventionality.

Neuroticism refers to dimensions of excitability, depression, self-consciousness, and impulsivity (John & Srivastava, 1999).

The BFI was included to measure exploratory questions of whether curiosity predicts empathic concern and distress over and above agreeableness and conscientiousness traits.

However, due to openness traits encompassing similar variables as curiosity, and agreeableness traits reflecting sympathetic and altruistic tendencies, we must be cautious of analyses including

these variables as controls. The other traits were included for purposes of investigating research questions outside the scope of this study. In Study 1, both openness ($\alpha = .73$) and agreeableness ($\alpha = .77$) had high internal consistency.

Interpersonal Reactivity Index (IRI, Davis, 1980). The IRI is a 28-item self-report questionnaire designed to measure four related but distinct dimensions of empathic responding on a 1 (*Not at all like me*) to 4 (*Very much like me*). Confirmatory factor analysis of an initial item pool generated from other empathy scales assessing both cognitive and emotional dimensions identified four independently-loading factors with high internal reliability (males/females): empathic concern ($\alpha = .68/.73$), personal distress ($\alpha = .77/.75$), perspective-taking ($\alpha = .71/.75$), and fantasy ($\alpha = .78/.79$). Later analyses found support for the four-factor structure of the measure (Carey, Fox, & Spraggins, 1988). Convergent validity has been established through associations between trait measures of perspective-taking and empathic accuracy (Bernstein & Davis, 1982) as well as positive relationships between empathic concern, emotionality and interpersonal concern (Davis, 1983a; 1983b) and has shown cross-cultural validity (De Corte et al., 2007). In Study 1 the variables of interest, empathic concern ($\alpha = .78$) and personal distress ($\alpha = .73$), had adequate internal reliability.

Demographic questions. Last, participants indicated their sex, age, and race/ethnicity.

Attention check questions. Seven questions were embedded at random points in the survey which asked participants control questions to check their attention (e.g., “This is a control question. Leave this question blank”). Participants who missed two or more questions were removed from the dataset.

Study 1 Results

Data Preparation and Preliminary Analyses

The final dataset of 180 participants was checked for assumptions of univariate and multivariate normality, linearity, and normally distributed errors. All assumptions were met with the exception of the SCS-G subscale, and the conscientiousness subscale of the BFI. Winsorizing three outliers within these subscales allowed the scales to meet all assumptions for OLS regression.¹ No variables were centered for the main analyses, with the exception of creating centered attachment security and curiosity variables for a moderation analysis. Preliminary bivariate correlations were conducted to examine zero-order relationships among variables, the results of which are shown in Table 1.

Hypothesis Tests: Trait Curiosity and Trait Empathy Relationships

Hypothesis 1 predicted that trait curiosity would be significantly positively correlated with trait empathic concern, but negatively correlated with trait personal distress. Consistent with Hypothesis 1, the stretching subscale of the CEI-II (stretching curiosity) was significantly positively related to empathic concern, $F(1, 170) = 9.83, p = .002, R^2 = .06, \beta = .23$. Stretching curiosity also was found to have a significant negative relationship with personal distress, $F(1, 172) = 9.91, p = .002, R^2 = .05, \beta = -.23$. Because these analyses are somewhat exploratory, in that no prior research has explicitly looked at the relationship between trait curiosity and empathic concern, I chose to use the stretching curiosity subscale for subsequent analyses of trait curiosity. This is because the stretching curiosity subscale had the strongest relationship with

¹ The SCS-General was kurtotic ($g_2 = 2.52$) and had two outliers with z-scores larger than ± 3.29 (three SDs above the mean): $Z = -4.31$ and $Z = -3.49$. The conscientiousness scale had one outlier with a z-score larger than 3.29; $Z = -3.46$. All three of these scores were winsorized to $Z = -3.29$, which substantially decreased the kurtosis in the SCS-general subscale ($g_{2\text{new}} = 1.17$) and did not negatively affect the normality of the conscientiousness scale. No additional transformations were conducted.

empathic concern relative to the embracing subscale and the total CEI-II scale, as well as had a stronger relationship with personal distress than the embracing subscale. Additionally, general social curiosity was significantly positively associated with empathic concern, $F(1, 169) = 13.07$, $p < .001$, $R^2 = .07$, $\beta = .27$. Although general social curiosity was unrelated to personal distress ($p > .20$), covert social curiosity was significantly positively related to personal distress, $F(1, 171) = 5.26$, $p = .02$, $R^2 = .03$, $\beta = .17$.

Assessing BIS/BAS as a possible explanatory variable. Next, I examined several control variables to identify whether the relationship between curiosity and empathy might be accounted for by other factors. I first examined behavioral approach and avoidance tendencies (measured by the BIS/BAS), then mindfulness, then the Big Five personality traits of openness and agreeableness. BIS/BAS sensitivity was measured first due to its strong theoretical relationship with curiosity. There is reason to believe curiosity is beneficial to empathy beyond these systems, as it facilitates seeking out and positively framing novel and uncertain situations in particular. Often, emergency situations elicit feelings of uncertainty (Latané & Darley, 1969), and curiosity may promote approaching this uncertainty rather than avoiding it. Furthermore, Kashdan and Roberts (2006) found that trait curiosity predicted greater positive affect during social interactions than behavioral approach motivation (measured through the BAS scale of the BIS/BAS) when both were entered as variables in a regression analysis, suggesting that curiosity's drive to seek out unfamiliar, challenging, or novel information may affect emotionality differently than general approach motivation.

However, any results of BIS/BAS as a control variable should be taken with caution. Spector and Brannick (2011) advise against using too many control variables that are not explicitly part of one's hypothesis, due to the possibility of meaningful variance being wiped out

erroneously. Because curiosity entails a drive to approach new experiences and perceive novelty and uncertainty as rewarding rather than aversive, curiosity has been construed as a specific manifestation of the behavioral activation system (Kashdan & Roberts, 2006). This suggests we should likely find that a large portion of the variance in empathy accounted for by curiosity would also be shared with trait behavioral approach (and perhaps avoidance) tendencies. Therefore even if curiosity's relationship with empathy is nullified by BIS/BAS sensitivity, it would not necessarily go against the study's primary hypothesis.

Stretching curiosity and empathic concern when accounting for BIS/BAS sensitivity.

To further investigate Hypothesis 1 that curiosity would positively predict empathic concern, and negatively predict personal distress, I explored whether curiosity uniquely predicted variance in empathy beyond general approach and avoidance motivation (see Table 2). First, I examined the effects of stretching curiosity on empathic concern. A hierarchical regression analysis was conducted with the control variables of the Behavioral Inhibition Scale (BIS), BAS Reward Responsiveness, and BAS Fun Seeking² entered in block 1, and stretching curiosity in block 2. The first model significantly predicted empathic concern, $F(3, 160) = 13.36, p < .001, R^2 = .20$. BIS ($\beta = .17$) and BAS Reward Responsiveness ($\beta = .38$) positively predicted empathic concern, whereas BAS Fun Seeking was unrelated to concern ($\beta = -.01$). When stretching curiosity was entered into the model, it significantly improved the prediction, $\beta = .23, \Delta R^2 = .046, \Delta F(1, 159) = 9.78, p = .002$. The full model was significant, $F(4, 159) = 13.01, p < .001, R^2 = .25$ (see Table 2). In support of Hypothesis 1, trait stretching curiosity was found to predict greater empathic concern even when controlling for BIS/BAS.

² BAS Drive was not entered as a control due to its non-significant relationship with empathic concern.

Table 1.

Correlations among Study 1 variables.

Measure	CEI	CEI-S	CEI-E	EC	PD	SCS-G	SCS-C	BIS	BAS-D	BAS-F	BAS-R	MAAS	BFI-A	BFI-O	ECR-Av	ECR-Ax
CEI	1	.95**	.95**	.20**	-.25**	.43**	.11	-.25**	.20**	.35**	.22**	.25**	.28**	.43**	-.33**	-.10
CEI-S	.95**	1	.79**	.23**	-.23**	.43**	.12	-.20**	.17*	.25**	.22**	.27**	.30**	.47**	-.29**	-.08
CEI-E	.95**	.79**	1	.14	-.22**	.38**	.10	-.26**	.22**	.41**	.20**	.20**	.22**	.35**	-.32**	-.10
EC	.20**	.25**	.14	1	.03	.27**	-.13	.24**	.08	.18*	.39**	.14	.61**	.24**	-.21**	.03
PD	-.25**	-.23**	-.22**	.03	1	-.01	.17*	.47**	-.20**	-.23**	-.15	-.41**	-.18*	-.16*	.21**	.54**
SCS-G	.43**	.43**	.38**	.27**	-.01	1	.51**	.13	-.04	.02	.20**	.16*	.32**	.33**	-.26**	.15
SCS-C	.11	.12	.10	-.13	.17*	.51**	1	.20**	-.09	-.13	-.07	-.10	-.11	.17*	.04	.32**
BIS	-.25**	-.20**	-.26**	.24**	.47**	.13	.20**	1	-.11	-.03	.23**	-.33**	.02	-.02	.11	.51**
BAS-D	.20**	.17*	.22**	.08	-.20**	-.04	-.09	-.11	1	.53**	.49**	-.05	.06	.05	-.19*	-.27**
BAS-F	.35**	.25**	.41**	.18*	-.23**	.02	-.13	-.03	.53**	1	.56**	-.15	.12	.14	-.15*	-.20**
BAS-R	.22**	.22**	.20**	.39**	-.15	.20**	-.07	.23**	.49**	.53**	1	-.03	.36**	.27**	-.18*	-.13
MAAS	.25**	.27**	.20**	.14	-.41**	.16*	-.10	-.33**	-.05	-.15	-.03	1	.30**	.17*	-.31**	-.37**
BFI-A	.28**	.30**	.22**	.61**	-.18*	.32**	-.11	.02	.06	.12	.36**	.30**	1	.20*	-.36**	-.16*
BFI-O	.43**	.47**	.35**	.24**	-.16*	.33**	.17*	-.02	.05	.14	.27**	.17*	.20*	1	-.06	.02
ECR-Avd	-.33**	-.29**	-.32**	-.21**	.21**	-.26**	.04	.11	-.19*	-.15*	-.18*	-.31**	-.36**	-.06	1	.31**
ECR-Anx	-.10	-.08	-.10	.03	.54**	.15	.32**	.51**	-.27**	-.20**	-.13	-.37**	-.16*	.07	.31**	1

Note. For all scales, higher scores are more indicative of extreme responding in the direction of the construct assessed. Significant correlations between curiosity, empathic concern, personal distress, and attachment measures are in bold. CEI: Curiosity and Exploration Inventory II (CEI-II) scale total score; CEI-Stretch: Stretching scale of the CEI-II; CEI-Embrace: Embracing subscale of the CEI-II; EC: Empathic Concern subscale of the Interpersonal Reactivity Index (IRI); PD: Personal Distress subscale of the IRI; SCS-G: General subscale of the Social Curiosity Scale (SCS); SCS-C: Covert subscale of the SCS; BIS: Behavioral Inhibition System; BAS-D: Behavioral Activation System (BAS) Drive; BAS-F: BAS Fun Seeking; BAS-R: BAS Reward Responsiveness; MAAS: Mindful Attention and Awareness Scale; BFI-A: Agreeableness subscale of the Big Five Inventory (BFI); BFI-O: Openness Subscale of the BFI. ECR-Av: Avoidance subscale of the Experiences in Close Relationships- Revised adult attachment scale (ECR-R); ECR-Ax: Anxiety subscale of the ECR-R. * $p < .05$, ** $p < .01$

Stretching curiosity and personal distress when accounting for BIS/BAS sensitivity. To assess the effects of stretching curiosity on personal distress when accounting for the behavioral inhibition and activation systems, a hierarchical regression analysis was conducted in which the control variables of BIS, BAS Drive, and BAS Fun Seeking³ in block 1, and stretching curiosity in block 2 (see Table 3). The first model showed BIS/BAS sensitivity significantly predicted empathic concern, $F(3, 163) = 20.95, p < .001, R^2 = .28$. BIS ($\beta = .17$) and BAS Reward Responsiveness ($\beta = .38$) positively predicted empathic concern, whereas BAS Fun Seeking was unrelated to concern ($\beta = -.01$). When stretching curiosity was entered into the model, it did not significantly improve the prediction, $\beta = -.09, \Delta R^2 = .008, \Delta F(1, 162) = 1.78, p = .18$. The full model was significant, $F(4, 162) = 16.23, p < .001, R^2 = .32$ (see Table 3). In contrast to empathic concern, the negative relationship between stretching curiosity and personal distress was accounted for by the behavioral inhibition and behavioral activation systems, which did not support the more conservative test of Hypothesis 1.

General social curiosity and empathic concern when accounting for BIS/BAS sensitivity. To examine whether general social curiosity predicted unique variance in empathic concern above and beyond the effects of the behavioral inhibition/activation systems, a hierarchical regression analysis was conducted with the control variables of the BIS scale, BAS Reward Responsiveness scale, and BAS Fun Seeking scale in the first block, and general social curiosity in block 2. The first model significantly predicted empathic concern, $F(3, 158) = 12.03, p < .001, R^2 = .19$. BIS ($\beta = .15$) and BAS Reward Responsiveness ($\beta = .39$) both positively predicted empathic concern, whereas BAS Fun Seeking was unrelated to empathic concern ($\beta = -.04$). When general social curiosity was entered into the model, it significantly improved

³ BAS Reward Responsiveness was not entered as a control due to its non-significant relationship with personal distress.

Table 2.

Hierarchical Multiple Regression Analyses Predicting Empathic Concern from Curiosity while Controlling for BIS/BAS Sensitivity

Analysis	Predictor	$R^2 \Delta$	$F\Delta$	Coefficient (β)
Stretching Curiosity				
Block 1	BIS			.17**
	BAS-FS			-.01
	BAS-RR			.38**
Block 2	Curiosity-Stretching	.05	9.78**	.23**
Gen. Social Curiosity				
Block 1	BIS			.15*
	BAS-FS			-.04
	BAS-RR			.39**
Block 2	Curiosity - Gen. Social	.05	9.71**	.22**

Note . BIS = Behavioral Inhibition System; BAS-FS = Behavioral Activation System Fun Seeking; BAS-RR = BAS Reward Responsiveness. * $p < .05$; ** $p < .01$

the prediction, $\beta = .22$, $\Delta R^2 = .047$, $\Delta F(1, 157) = 9.71$, $p = .002$. The full model was significant, $F(4, 157) = 11.94$, $p < .001$, $R^2 = .23$ (see Table 2). Overall, in support of Hypothesis 1, general social curiosity predicted greater empathic concern even when controlling for the approach and avoidance motivations reflected by behavioral inhibition and behavioral activation systems.

Covert social curiosity and personal distress when accounting for BIS/BAS sensitivity.

Because covert, but not general curiosity was highly correlated with personal distress, a hierarchical regression analysis was conducted to test the effects of covert social curiosity on personal distress when accounting for the behavioral inhibition and activation system sensitivity, with the control variables of BIS, BAS Drive, and BAS Fun Seeking entered in block 1, and covert curiosity in block 2 (see Table 3). The first model significantly predicted personal distress $F(3, 161) = 20.53$, $p < .001$, $R^2 = .26$. BIS positively predicted distress ($\beta = .46$), BAS Fun Seeking negatively predicted distress ($\beta = -.16$), and BAS Drive was unrelated to distress ($\beta = -$

.10). When covert social curiosity was entered as a predictor in block 2, it did not significantly improve the model, $\beta = .05$, $\Delta R^2 = .002$, $\Delta F(1, 160) = .48$, $p = .50$. The full model was significant, $F(4, 160) = 15.48$, $p < .001$, $R^2 = .26$ (see Table 3). Similarly to stretching curiosity, covert social curiosity's positive relationship personal distress was statistically accounted for by the broader approach and avoidance regulation systems.

Table 3.

Hierarchical Multiple Regression Analyses Predicting Personal Distress from Curiosity while Controlling for BIS/BAS Sensitivity

Analysis	Predictor	$R^2 \Delta$	$F\Delta$	Coefficient (β)
Stretching Curiosity				
Block 1	BIS			.46**
	BIS-FS			-.18*
	BAS-D			-.09
Block 2	Curiosity - Stretching	.01	1.78	-.09
Covert Social Curiosity				
Block 1	BIS			.46**
	BIS-FS			-.16*
	BAS-D			-.10
Block 2	Curiosity - Covert Social	.001	0.51	.05

Note . BIS = Behavioral Inhibition System; BAS-FS = Behavioral Activation System Fun Seeking; BAS-D = BAS Drive. * $p < .05$; ** $p < .01$

Assessing mindfulness as a potential explanatory variable. Next, I investigated whether curiosity would further positively predict empathic concern and negatively predict personal distress above and beyond the effects of mindfulness. A mindful state of attention and awareness is partially characterized by lowered defensiveness, increased curiosity, and openness toward situational details (Bishop et al., 2004). However, trait mindfulness and curiosity are distinct psychological constructs and have been shown to have a somewhat surprisingly weak negative correlation (Kashdan et al., 2009; Kashdan et al., 2011). Greater mindfulness has been

reliably shown to predict greater empathic concern and lower personal distress whether measured as a trait index (Beitel, Ferrer, & Cecero, 2005; Shapiro, Brown, Thoresen, & Plante, 2011), a temporarily-induced mindful state (Tan, Lo, & Macrae, 2014) or as the result of meditation training (Birnie, Speca, & Carlson, 2010; Condon, Desbordes, Miller, & DeSteno, 2013; Shapiro et al., 2011). Thus it would be of interest to determine whether curiosity's relationship with empathy is accounted for by mindful attention and awareness, or if curiosity exerts an independent effect on empathic responding. If curiosity promotes empathy through resources like greater present-oriented attention and nonjudgmental interpersonal awareness, mindfulness may account for the effects of curiosity on empathic concern. However, because it has been shown that the relationship between curiosity and personal distress is accounted for by BIS/BAS sensitivity, I did not perform further control analyses of personal distress.

Stretching curiosity and empathic concern when controlling for mindfulness and BIS/BAS. In order to examine how curiosity was related to empathic concern over and above mindfulness and behavioral inhibition/activation, a hierarchical regression model predicting trait empathic concern was constructed with mindfulness, BIS, BAS Reward Responsiveness, and BAS Fun Seeking in the first block (BAS Drive was not significantly correlated with empathic concern), and stretching curiosity in the second block (see Table 4). The control variables of mindfulness, behavioral inhibition, and behavioral activation significantly predicted empathic concern, $F(4, 156) = 13.07$, $p < .001$, $R^2 = .25$. Mindfulness ($\beta = .25$), BIS ($\beta = .27$), and BAS Reward Responsiveness ($\beta = .34$) positively predicted empathic concern, whereas BAS Fun Seeking was unrelated to concern ($\beta = .05$). When the stretching curiosity subscale was entered as a predictor, the model was significantly improved and stretching curiosity positively predicted empathic concern, $\beta = .18$, $\Delta R^2 = .03$, $\Delta F(1, 155) = 5.83$, $p = .02$. The final model significantly

predicted empathic concern, $F(5, 155) = 11.95, p < .001, R^2 = .28$ (see Table 4). Thus, in support of Hypothesis 1 the stretching component of generalized curiosity significantly predicts empathic concern over and above the effects of mindfulness and behavioral inhibition/activation system sensitivity.

Table 4.

Hierarchical Multiple Regression Analyses Predicting Empathic Concern from Curiosity while Controlling for Mindfulness and BIS/BAS Sensitivity

Analysis	Predictor	$R^2 \Delta$	$F\Delta$	Coefficient (β)
Stretching Curiosity				
Block 1	MAAS			.25**
	BIS			.27**
	BAS-FS			.05
	BAS-RR			.34**
Block 2	Curiosity-Stretching	.03	5.83*	.18**
Gen. Social Curiosity				
Block 1	MAAS			.26**
	BIS			.26**
	BAS-FS			.03
	BAS-RR			.34**
Block 2	Curiosity - Gen. Social	.03	6.55**	.19**

Note . MAAS = Mindful Attention and Awareness Scale; BIS = Behavioral Inhibition System; BAS-FS = Behavioral Activation System Fun Seeking; BAS-RR = BAS Reward Responsiveness. * $p \leq .05$; ** $p \leq .01$

Social curiosity and empathic concern when controlling for mindfulness and BIS/BAS.

Social curiosity was also examined as a predictor of empathic concern and personal distress using a hierarchical regression model (see Table 4). In the first block, mindfulness, BIS, BAS Reward Responsiveness, and BAS Fun Seeking together significantly predicted 24% of the variance in empathic concern, $F(4, 154) = 12.31, p < .001, R^2 = .24$. Mindfulness ($\beta = .26$), BIS ($\beta = .26$), and BAS Reward Responsiveness ($\beta = .34$) positively predicted empathic concern, whereas BAS Fun Seeking was unrelated to concern ($\beta = .03$). When added to the second block

of the model, general social curiosity significantly improved fit and positively predicted empathic concern, $\beta = .19$, $\Delta R^2 = .03$, $\Delta F(1, 153) = 6.55$, $p = .01$. The full model significantly predicted empathic concern, $F(5, 153) = 11.51$, $p < .001$, $R^2 = .27$ (see Table 4). Consistent with my hypothesis, general social curiosity significantly predicted empathic concern over and above the effects of mindfulness, behavioral inhibition, and behavioral activation systems.

Assessing personality traits as potential explanatory variables. It was also of interest to identify whether the effects of curiosity on empathy could be explained by openness or agreeableness traits. First, openness, mindfulness, BIS sensitivity, BAS Fun-Seeking, and BAS Reward Responsiveness was entered into a hierarchical regression model in block 1, with stretching curiosity in block 2 (see Table 5). In this analysis, control variables significantly predicted empathic concern traits, $F(5, 152) = 11.31$, $p < .001$, $R^2 = .27$. Openness ($\beta = .15$), mindfulness ($\beta = .22$), BIS ($\beta = .27$), and BAS Reward Responsiveness ($\beta = .30$) all significantly positively predicted empathic concern. BAS Fun Seeking, as before, did not predict concern ($\beta = .05$). Stretching curiosity did not significantly improve model fit, $\beta = .14$, $\Delta R^2 = .01$, $\Delta F(1, 151) = 4.15$, $p = .10$, and the final model was significant, $F(6, 149) = 9.804$, $p < .001$ (see Table 5).

General social curiosity was also tested to identify whether it predicted empathy beyond the effects of openness (see Table 5). Openness along with the BIS/BAS and mindfulness controls significantly predicted empathic concern, $F(5, 150) = 10.68$, $p < .001$, $R^2 = .26$. Openness ($\beta = .15$), mindfulness ($\beta = .24$), BIS ($\beta = .26$), and BAS Reward Responsiveness ($\beta = .28$) all significantly positively predicted empathic concern. BAS Fun Seeking, as before, did not predict concern ($\beta = .04$). Although a marginal increase, general social curiosity still significantly predicted better model fit when entered into block 2, $\beta = .16$, $\Delta R^2 = .02$, $\Delta F(1, 149) = 4.26$, $p = .04$. The full model was also significant, $F(6, 149) = 9.80$, $p < .001$, $R^2 = .28$ (see

Table 5). Overall, both stretching and social curiosity are significantly related to empathic concern over and above the effects of openness, supporting Hypothesis 1.

Table 5.

Hierarchical Multiple Regression Analyses Predicting Empathic Concern from Curiosity while Controlling for Openness, Mindfulness and BIS/BAS Sensitivity

Analysis	Predictor	$R^2 \Delta$	$F\Delta$	Coefficient (β)
Stretching Curiosity				
Block 1	Openness			.15*
	MAAS			.22**
	BIS			.27**
	BAS-FS			.05
	BAS-RR			.30**
Block 2	Curiosity-Stretching	.01	4.15	.14
Gen. Social Curiosity				
Block 1	Openness			.15*
	MAAS			.24**
	BIS			.26**
	BAS-FS			.04
	BAS-RR			.28**
Block 2	Curiosity - Gen. Social	.02	4.26	.16*

Note . Openness = BFI Openness subscale; MAAS = Mindful Attention and Awareness Scale; BIS = Behavioral Inhibition System; BAS-FS = Behavioral Activation System Fun Seeking; BAS-RR = BAS Reward Responsiveness. * $p \leq .05$; ** $p \leq .01$

Agreeableness may also account for some of the relationship between curiosity and empathic concern due to the trait's high relationship with positive emotionality and prosocial motivation (Graziano, Habashi, Sheese, & Tobin, 2007). In these analyses, I entered agreeableness traits without openness traits as well, given that openness accounted for most of the remaining variance in empathy due to curiosity (see Table 6). To assess whether agreeableness accounted for curiosity's remaining effect on empathic concern, I entered agreeableness, BIS sensitivity, BAS Fun Seeking, and BAS Reward Responsiveness in block 1

and added stretching curiosity in block 2. The control variables significantly predicted empathic concern traits, $F(5, 153) = 25.16, p < .001, R^2 = .45$. Specifically, agreeableness ($\beta = .52$), mindfulness ($\beta = .07$), and BIS ($\beta = .24$) positively predicted empathic concern, whereas BAS Fun Seeking ($\beta = .05$) and BAS Reward Responsiveness ($\beta = .14$) did not significantly predict concern. Stretching curiosity did not significantly improve model fit, $\beta = .07, \Delta R^2 = .01, \Delta F(1, 152) = 1.30, p = .26$, and the final model was significant, $F(6, 152) = 21.23, p < .001, R^2 = .46$ (see Table 6).

Table 6.

Hierarchical Multiple Regression Analyses Predicting Empathic Concern from Curiosity while Controlling for Agreeableness, Mindfulness and BIS/BAS Sensitivity

Analysis	Predictor	$R^2 \Delta$	$F\Delta$	Coefficient (β)
Stretching Curiosity				
Block 1	Agreeableness			.52**
	MAAS			.07
	BIS			.24**
	BAS-FS			.05
	BAS-RR			.14
Block 2	Curiosity-Stretching	.01	1.30	.07
Gen. Social Curiosity				
Block 1	Agreeableness			.53**
	MAAS			.08
	BIS			.23**
	BAS-FS			.05
	BAS-RR			.13
Block 2	Curiosity - Gen. Social	.003	.91	.06

Note . Agreeableness = BFI Agreeableness subscale; MAAS = Mindful Attention and Awareness Scale; BIS = Behavioral Inhibition System; BAS-FS = Behavioral Activation System Fun Seeking; BAS-RR = BAS Reward Responsiveness. * $p \leq .05$; ** $p \leq .01$

Next, general social curiosity was examined for its effects on empathic concern beyond agreeableness traits, BIS/BAS and mindfulness. Agreeableness, BIS sensitivity, BAS Fun

Seeking, and BAS Reward Responsiveness were entered in block 1 and general social curiosity was entered in block 2. The control variables again significantly predicted curiosity, $F(5, 151) = 24.80, p < .001, R^2 = .45$. Specifically, agreeableness ($\beta = .53$) and BIS ($\beta = .23$) significantly positively predicted empathic concern, whereas BAS Fun Seeking ($\beta = .05$) and BAS Reward Responsiveness ($\beta = .14$) did not significantly predict concern. When social curiosity was entered into the model it did not significantly improve fit, $\beta = .06, \Delta R^2 = .003, \Delta F(1, 150) = .91, p = .34$. The overall model was again significant, $F(6, 150) = 20.81, p < .001, R^2 = .45$ (see Table 6). Overall, neither nonspecific (stretching) nor social curiosity related to empathic concern after accounting for the effects of agreeableness, mindfulness, and behavioral approach/avoidance motivation.

Hypothesis Tests: Attachment, Curiosity and Empathy Relationships

Hypothesis 3a predicted that attachment avoidance would be negatively related to curiosity indices, whereas anxious attachment would be unrelated to curiosity. Simple linear regressions were conducted to test this prediction (as well as Hypotheses 3b and 3c). Supporting Hypothesis 3a, attachment avoidance significantly negatively predicted stretching curiosity, $F(1, 166) = 15.76, p < .001, R^2 = .09, \beta = -.29$, and general social curiosity, $F(1, 165) = 12.37, p < .001, R^2 = .07, \beta = .26$. Attachment avoidance was unrelated to covert social curiosity, $F(1, 165) = .32, p = .57, \beta = .04$.

In contrast, attachment anxiety was unrelated to stretching curiosity, $F(1, 165) = 1.172, p = .28, \beta = -.09$; marginally positively related to general social curiosity, $F(1, 163) = 3.68, p = .06, R^2 = .02, \beta = .15$; and significantly positively related to covert social curiosity, $F(1, 163) = 18.84, p < .001, R^2 = .10, \beta = .32$. This suggests that those who are high in avoidant attachment insecurity are also likely to be less curious and willing to explore new information in general. In

contrast, higher attachment anxiety may predict greater interest in others, but particularly promotes the desire to learn about others in secret or learn about their private lives.

Hypothesis 3b predicted that both avoidance and anxiety will negatively predict empathic concern indices. Avoidant attachment was found to be significantly negatively related to empathic concern, $F(1, 176) = 7.86, p = .006, R^2 = .05, \beta = -.21$. However, anxious attachment insecurity was unrelated to empathic concern traits, $F(1, 163) = .12, p = .73, \beta = .03$. This suggests that those higher in avoidant attachment insecurity report themselves as being less sympathetic and compassionate for others in their day-to-day lives, providing partial support for Hypothesis 3b.

Hypothesis 3c proposed that attachment anxiety will be positively related to personal distress indices, whereas attachment avoidance should be unrelated to distress. A simple linear regression found that attachment anxiety was significantly positively related to personal distress, $F(1, 165) = 68.77, p < .001, R^2 = .29, \beta = .54$. In contrast to predictions, avoidant attachment was also found to be significantly positively related to personal distress, $F(1, 168) = 8.03, p = .005, R^2 = .05, \beta = .21$. Thus, both attachment avoidance and anxiety positively predicted personal distress traits. These results partially support Hypothesis 3c.

Hypothesis 3d proposed that attachment anxiety would moderate the relationship between curiosity and empathic concern, such that those high in anxious attachment should show a weaker association between curiosity and empathic concern compared to those low in attachment anxiety. Hierarchical regression was used to test this hypothesis. Prior to analyses, I centered the variables of anxiety, stretching curiosity, and general social curiosity, and created product terms for attachment anxiety*stretching curiosity and attachment anxiety*social curiosity using the centered variables (Baron & Kenny, 1986).

First stretching curiosity was tested. Stretching curiosity was positively related to empathic concern, $\beta = .18$, $t(162) = 2.43$, $p = .02$, and attachment anxiety was unrelated to empathic concern after controlling for curiosity, $\beta = .07$, $t(162) = .93$, $p = .36$. However, a significant interaction term of stretching curiosity*attachment anxiety emerged, $\beta = -.28$, $t(162) = -3.66$, $p < .001$, $R^2\Delta = .07$, suggesting a moderation effect (Baron & Kenny, 1986). Supporting Hypothesis 3d, the relationship between stretching curiosity and empathic concern was moderated by attachment anxiety, such that as attachment anxiety increased, the positive relationship between stretching curiosity and empathic concern becomes weaker and even slightly reverses direction. These data suggest anxious attachment does moderate the effect of curiosity on empathic concern: among those low in stretching curiosity, higher anxious attachment actually predicts greater empathic concern toward others than low anxious attachment and low curiosity. In contrast, among those high in stretching curiosity, higher anxious attachment predicts less empathic concern.

I next used Preacher's online calculator (Preacher, 2015) to identify simple slopes for the association between stretching curiosity and trait empathic concern. The relationship between stretching curiosity and empathic concern was tested at low (-1 SD below the mean), moderate (mean) and high (+1 SD above the mean) levels of attachment anxiety. The relationship between curiosity and empathic concern was more strongly positively related at low levels of anxiety, $b = 2.69$, $SE = .59$, $p < .001$, than at moderate levels of anxiety, $b = 1.16$, $SE = .48$, $p = .02$. At high levels of attachment anxiety, the relationship between trait stretching curiosity and trait empathic concern became nonsignificant, $b = -.37$, $SE = .67$, $p = .58$ (see Figure 7).

To further test this hypothesis, another hierarchical regression analysis was run with general social curiosity as the independent variable. Social curiosity was positively related to

empathic concern, $\beta = 2.60$, $t(160) = 3.19$, $p = .002$. Anxious attachment was not significantly related to empathic concern after controlling for social curiosity, $\beta = -.01$, $t(160) = -.18$, $p = .86$. However, the interaction term of anxiety*social curiosity was not significant, $\beta = -.03$, $t(160) = -.34$, $p = .74$, and therefore indicated no moderation of the social curiosity-empathic concern relationship by attachment security. Regardless of anxious attachment insecurity, social curiosity was positively related to empathic concern.

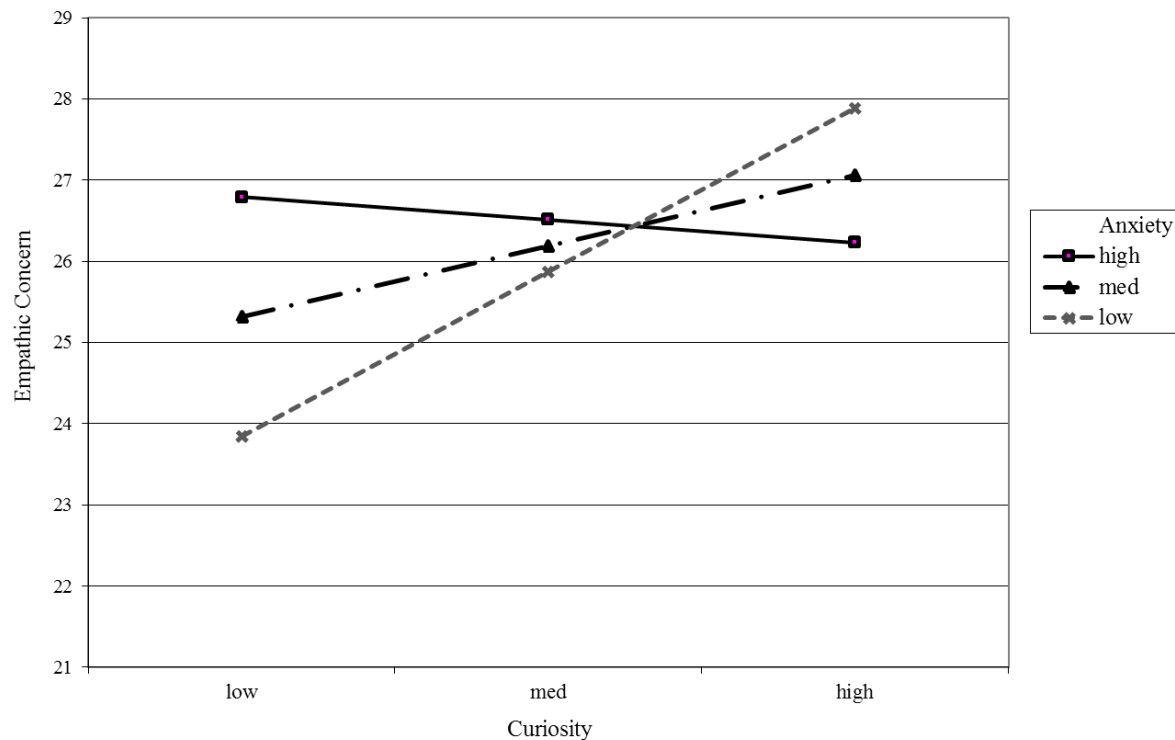


Figure 7. Moderation effects of anxious attachment insecurity on the relationship between trait curiosity and empathic concern.

Hypothesis 3d also predicted that attachment anxiety would moderate the relationship between curiosity and personal distress. To test whether anxiety moderates the negative relationship between stretching curiosity and personal distress, a hierarchical regression indicated that stretching curiosity negatively predicted personal distress, $\beta = -.18$, $t(164) = -2.69$,

$p = .01$. Anxious attachment also positively predicted distress, $\beta = .53$, $t(164) = 8.09$, $p < .001$.

However, anxious attachment did not moderate the curiosity/distress relationship, $\beta = .01$, $t(164) = .21$, $p = .83$. Regardless of anxious attachment insecurity, stretching curiosity negatively predicted personal distress.

I also investigated whether anxious attachment moderates the positive relationship between covert social curiosity and personal distress. Despite having a positive correlation with personal distress, covert social curiosity was not significantly related to distress in the final model, $\beta = -.01$, $t(158) = -.18$, $p = .86$. Anxious attachment was significantly related to distress, $\beta = .54$, $t(158) = 7.58$, $p < .001$, but did not moderate the curiosity/distress relationship, $\beta = .03$, $t(158) = .45$, $p = .66$. Thus Hypothesis 3d was partially supported; the relationship between curiosity and personal distress was consistent across levels of anxious attachment.

Study 1 Discussion

Study 1 investigated Hypothesis 1, predicting that curiosity (either social or nonspecific) would positively relate to empathic concern. The findings support this prediction, as both nonspecific curiosity (measured by the stretching subscale of the CEI-II) and social curiosity (SCS) uniquely predict empathic concern over and above the effects of approach/avoidance motivation and mindfulness. Furthermore, both types of curiosity predict approximately 5% of the variance in trait empathic concern even when controlling for most of these variables, which is similar to what stretching and social curiosity predict on their own.

However, curiosity did not account for empathic concern above and beyond the effects of openness or agreeableness traits when compared alongside BIS/BAS sensitivity and mindfulness. This result is unsurprising, since openness traits to a large extent reflect curious dispositions and willingness to explore new ideas (John & Srivastava, 1999). Furthermore, agreeableness traits

very strongly predict prosocial emotions and behaviors, including empathic concern; in fact, some research suggests that agreeableness traits can moderate the effects of inducing empathy on helping when costs of helping are high, suggesting that having an agreeable disposition strongly promotes the kind of intuitive, automatic empathic responding which curiosity is thought to promote (Graziano et al., 2007). Because these Big Five personality dimensions can be thought to create dispositions suitable for curiosity and empathic concern, these findings do not necessarily go against my hypothesis concerning the robust relationship between curiosity and empathic concern.

In addition, I hypothesized curiosity would negatively predict personal distress; this prediction was only partially supported. Although stretching curiosity negatively correlates with personal distress, and covert (self-serving) curiosity positively correlates with personal distress, these relationships are statistically accounted for by behavioral approach and avoidance motivation as reflected by BIS/BAS sensitivity. This suggests that although individuals high in curiosity may tend to feel less personal distress on average, this relationship is explained by curious people being more approach-oriented toward rewarding information and less avoidant of distressing information or experiences.

Study 1 also investigated how attachment insecurity relates to trait measures of curiosity, empathic concern, and personal distress. In support of Hypothesis 3a, attachment avoidance was negatively related to both stretching and general social curiosity. This supports prior findings that attachment avoidance negatively predicts exploration and curiosity (Coy et al., 2012; Green & Campbell, 2000, Mikulincer, 1997).

Although not a specific hypothesis, attachment anxiety was also positively related to covert curiosity – motivation to seek out information about others in secret and find out

extremely personal information, such as why a couple might be fighting (question 10 of SCS scale). This corroborates prior findings that socially anxious individuals are more likely to endorse covert curiosity, which may be due to anxious individuals' greater need to try and control their social environment (Renner, 2006). Anxiously-attached individuals are likely to feel that those close to them might hurt or abandon them, or be unavailable when needed; by finding out information from others in secret, they may feel they are less likely to embarrass themselves or harm their relationships. In contrast, attachment anxiety was unrelated to stretching or general social curiosity, corroborating the findings of Green and Campbell (2000).

In partial support of Hypothesis 3b, attachment anxiety and avoidance were negatively related to empathic concern, although the correlation between anxiety and empathic concern was too weak to be significant. In contrast, supporting Hypothesis 3c, attachment avoidance was negatively related to personal distress, whereas attachment anxiety was positively related to distress. These results were predicted because of the hyperactivating and deactivating strategies of anxious and avoidant attachment systems. Deactivating one's attachment responses theoretically decreases feelings of compassion, closeness, and perceived need to belong (Mikulincer & Shaver, 2012), which should buffer against empathic concern and other social emotions in general. However, hyperactivating attachment systems would heighten one's sensitivity to belongingness and care needs, suggesting greater curiosity and interest in another's experiences, but also promote distress and self-orientation which would actually hinder feelings of compassionate concern for others.

Lastly, I found support for Hypothesis 3d, that anxious attachment insecurity would moderate the relationship between curiosity and empathic concern, such that those higher in anxious attachment would show a weaker relationship between curiosity and empathic concern.

Our sample showed that in fact, high attachment anxiety predicted a non-significant slope in the curiosity-empathic concern relationship, whereas among those with low or moderate attachment anxiety, curiosity positively related to trait empathic concern.. As suggested by the positive relationship attachment anxiety and social curiosity, perhaps high attachment anxiety promotes curiosity about details of the individual which are unrelated to promoting empathy and a desire to help. For instance, interacting with an outgroup member who elicits high curiosity but also high discomfort or anxiety could elicit feelings of curiosity which are unsympathetic, as suggested by Carroll and colleagues (2012) in their investigation of students' willingness to interact with a transgender individual.

These results suggest that promoting curiosity may facilitate feeling empathic concern for others experiencing pain or distress, and may promote greater social warmth when communicating with others. However, Study 1 had several methodological limitations. Because it was a cross-sectional correlational design, I cannot specify that greater curiosity was what caused greater empathic concern. I also asked participants to report their curiosity and empathy in general, rather than toward a specific person in need. In Study 2, these issues were addressed by experimentally manipulating curiosity toward a sympathy-inducing confederate, then assessing participants' feelings of empathic concern, personal distress, and various forms of state curiosity.

Study 2 Method

Study 2 attempted to extend the findings of Study 1, providing experimental evidence to support the curiosity/empathy relationship. Participants were exposed to a manipulation attempting to induce high or low curiosity, then watched a video interview of another student as

she discussed her recent cancer diagnosis. State empathic curiosity and personal distress, as well as state curiosity and willingness to help were assessed as the main dependent variables.

Pilot Study

I initially designed two versions of an experimental manipulation of curiosity. One version sought to influence curiosity by providing different descriptions of the student being interviewed (description manipulation). The high curiosity condition of the descriptive manipulation showed participants facts about the student which were more ambiguous, unique, and novel, as suggested by Kashdan and Fincham (2005). In the low curiosity condition, participants saw three descriptors that were more mundane, less ambiguous, and less novel.

The other possible curiosity manipulation (mindfulness-based manipulation) which was tested was based on a step-by-step mindfulness induction as part of a larger mindfulness-based stress reduction course (Williams et al., 2007). This induction is particularly focused on eliciting curiosity about one's present experiences and sensations. This mindfulness-based manipulation entailed participants seeing a portrait-style picture of "Sarah," the student in the interview video. While being presented with the picture, participants in the high-curiosity condition were asked to think about Sarah in a curious manner; participants in the low-curiosity condition read instructions to think about Sarah while keeping their mind free of questions (see Table 7 for full instructions for each manipulation).

An initial sample of 10 undergraduate students was recruited to take part in an electronic pilot study to test the effectiveness of these two manipulations. Due to the low sample size and the need to recruit a sample of students quickly, an additional sample of 149 individuals was recruited from posting a link on an online site dedicated to recruiting volunteer participants for surveys (www.crowdfunder.com), which required that participants be college students. The

online participant sample was larger than expected; I had only expected to recruit 50-100 participants during the one week that the online link was posted. Participants were randomly assigned to read one of the four manipulations, and then reported their state feelings of curiosity

Table 7.

Full Text of Description-Based and Mindfulness-Based Curiosity Manipulations

Manipulation	Condition	
	High	Low
Description-based	<ul style="list-style-type: none"> • Name: Sarah • Physics/English double major • Unexpected life event occurred recently • Has an uncommon medical condition 	<ul style="list-style-type: none"> • Name: Sarah • History/English double major • Unexpectedly moved from Newport News to Fredericksburg, VA recently • Has a common medical condition
Mindfulness-based	First, look at Sarah's picture. Imagine that you've just dropped in from Mars and have never seen a human before in your life. Also, please note that she is unique compared to many other people. Focus on interesting details of her picture and think about what questions you might have while watching her interview.	First, look at Sarah's picture. Imagine that you've just come to school and met her, and she strikes you as a very average person. There doesn't seem to be anything unique or interesting about her compared to other people. Focus on the surface details of the picture and think about what Sarah is probably like.

and interest on a 1 (*Not at all*) to 7 (*Very much*) scale using three items from the Melbourne Curiosity Scale – State (MCS-S; Naylor, 1981): “I feel inquisitive”; “I want to know more about Sarah”; and “I am wondering what will happen.” Participants were not compensated for volunteering.

Independent samples t-tests were conducted to assess the mean difference between the high and low curiosity conditions for each manipulation type. Among all participants, the

mindfulness-based manipulation did not elicit a significant difference in state curiosity between the high and low conditions, $t(67) = 1.51, p = .14$, although the mean values were in the expected direction ($M_{high} = 4.34, SD_{high} = 1.83; M_{low} = 3.74, SD_{low} = 1.52$). However, the description-based manipulation did have the intended effect on state curiosity, $t(88) = 3.16, p = .002$. Those who read the high-curiosity description of Sarah reported a mean state curiosity of 4.31 ($SD = 1.41$), whereas those who read the low-curiosity description had a mean curiosity of 3.36 ($SD = 1.43$). Therefore, not only was the description-based manipulation a stronger induction of curiosity, but it also showed less variance than the mindfulness-based manipulation.

Because the pilot study included individuals who are not part of the undergraduate population being sampled, I conducted a two-way factorial ANOVA to identify whether there was a significant interaction between participant type and condition in self-reported curiosity. There was a significant main effect of condition, such that curiosity differed significantly by condition, $F(3, 151) = 4.42, p = .005$, partial $\eta^2 = .08$; however, there was no main effect of participant type, $F(1, 151) = 2.43, p = .12$, partial $\eta^2 = .02$. There was also no significant interaction between participants and curiosity condition, $F(3, 151) = 1.94, p = .13$, partial $\eta^2 = .04$. Although the large differences in sample size between VCU and online participants may have skewed the results of this analysis, they suggest online and undergraduate participants responded similarly to the two types of manipulations. Therefore, the description-based manipulation was included in Study 2.

Participants and Design

One hundred and twelve undergraduate participants took part in Study 2. A total of 23 participants were eliminated from the final data set due to a computer failure not recording post-video data ($n = 1$), failing attentional check questions ($n = 4$), indicating suspicion about the

validity of the interview video ($n = 16$), or indicating a high suspicion of the study in general measured as marking a 4 or 5 on a 1 to 5 rating scale of general suspicion ($n = 2$). This left a final sample of 89 participants.

Participants were undergraduate students at Virginia Commonwealth University, and participated for course credit. Students who participated in Study 1 were excluded from taking Study 2. The sample consisted of 24.7% males, 74.2% females, and 1.1% other-identified ('gender-fluid') students aged 18 to 45 years old ($M = 21.44$, $SD = 4.77$). The sample was racially diverse, with 36% of students identifying as White, 27% Black or African-American, 10.1% Indian, 14.6% Asian, 3.3% Hispanic/Latino, 6.7% Mixed Race, and 5.9% not responding.

Because Study 2 analyses could also include up to three tested variables and seven control variables, G*Power indicated a minimum of 96 participants were required to detect effects at 80% power where $\alpha = .05$.

Procedure

All study procedures were approved by the Institutional Review Board of Virginia Commonwealth University. Participants completed all measures in a computer lab with up to seven other students. Upon giving informed consent, participants were randomly assigned to receive either the low curiosity or high curiosity condition.⁴ A research assistant then instructed participants that they would be completing two short studies that were being run together to increase sample size. The initial set of questionnaires ("Study 1") was said to be a personality survey of VCU students. The second part ("Study 2") was disguised as "part of an ongoing project to increase VCU Counseling Psychology students' effectiveness in counseling by

⁴ This randomization was done by using a random integer list generator of 1's and 2's. The order in which the integers were generated was used as the order in which participants were assigned a condition (1 = high, 2 = low) based on their participant number in the study (e.g., 1H, 2H, 3L etc.).

focusing on different aspects of the interview session.” Participants were informed they would watch a video of another student being interviewed, then respond to some questions about the interviewee so as to “investigate social norms at VCU.”

Initial trait measures. Participants first completed a set of questionnaires including the CEI-II, SCS, ECR-R, MAAS, BIS/BAS, and BFI. After this set of questionnaires participants were encouraged to rest for a few minutes before moving on to the next set of tasks. After choosing to move forward, participants read:

In this next study, we will ask you to watch a short video and then respond to a few questions about your reactions to the video. The video shows a short interview with another VCU student. This student was recruited from the general VCU population and did not come to University Counseling Services for counseling. Before you watch the video, please read the following information about Sarah carefully.

Then participants read either the high-curiosity bio or low-curiosity bio about “Sarah” (see Table 7; Description Manipulation).

Manipulation check/pre-video state curiosity. After reading Sarah’s bio, participants were asked to respond to three questions assessing state curiosity as a check of the curiosity manipulation, taken from the Melbourne Curiosity Scale (Naylor, 1981): “I feel inquisitive”; “I want to know more about Sarah”; and “I am wondering what will happen.” Participants responded on a 1 (*Not at all*) to 4 (*Very much*) scale.

Interview video. After reading the curiosity manipulation, participants were directed to a video of an interview with a female student, a confederate. In the video, the interviewer asks a set of questions about the student’s life, family, and interests at school. About halfway through the interview, the student shares with the interviewer that she had recently been diagnosed with Hodgkin’s Lymphoma in response to being asked about a negative event she had gone through recently. She detailed her experience first coming down with symptoms, getting tested for the

disease, and finally her thoughts about her upcoming chemotherapy treatment (see Appendix C for script). This interview paradigm is adapted from Westmaas and Silver (2001).

State empathic concern and personal distress. After listening to the recording, participants completed the Emotional Reactions Questionnaire (Batson et al., 1987) to indicate their self-rated feelings of empathy and personal distress at the moment. Participants reported the extent to which they felt empathic concern and personal distress-related emotions as a result of watching the video on a scale from 1 (*Not at all*) to 9 (*Extremely*). The list included six adjectives related to empathic concern (*sympathetic, compassionate, soft-hearted, warm, tender, and moved*) as well as eight adjectives related to personal distress (*alarmed, grieved, troubled, distressed, upset, disturbed, worried, and perturbed*) that have been used in previous studies to measure sympathetic and distressed reactions to another person (e.g., Batson et al., 1987; Batson et al., 2007)

Post-video state curiosity. Afterwards, participants reported their state feelings of curiosity on the Melbourne Curiosity Inventory- State Scale (MCI-S; Naylor, 1981). The MCI-S is a 20-item scale measuring transient feelings of curiosity on a four-point scale (1 = *Not at all*; 4 = *Very much*) Likert scale (e.g., “I want to know more”). The measure has been reported to exhibit high internal consistency and convergent validity with other measures of curiosity (Naylor, 1981) as well as high divergent validity with measures of anxiety (Boyle, 1989).

After rating their state curiosity on the MCI-S, participants responded to three questions about their curiosity toward different types of information presented in the video: “I want to know more about how Sarah is doing right now,” “I want to know more about Sarah’s disease,” and “I want to know more about Sarah’s personality and background.” Responses were scored on a 1 (*Strongly disagree*) to 7 (*Strongly agree*) scale.

Thought-listing task. Then, participants completed Cacioppo, von Hippel, and Ernst's (1997) thought-listing task, responding to these instructions:

We are now interested in everything that went through your mind while watching the interview. Please list these thoughts, whether they were about yourself, the situation, and/or the people in the video; whether they were positive, neutral, and/or negative. Any case is fine. Ignore spelling, grammar, and punctuation. You will have 2.5 minutes to write, after which you may continue to the next page.

Because REDCap does not allow for timed electronic text entry, participants were in fact able to move to the next question immediately, but were told to write for 2.5 minutes to give an anchor for students to focus on and reduce extraneous variability in response length.

Trait empathy. Participants next reported their trait empathic concern, personal distress, perspective-taking, and fantasy tendencies on the IRI (Davis, 1980).

Demographic questions. Afterward, participants reported their demographic information (the same variables as in Study 1).

Deception check. Participants were asked to report any suspicions about the study. To try and elicit unbiased responses as well as continue the cover story up until the final task, participants read that:

Many psychology studies use deception in order to create realistic scenarios, and this may make participants suspicious. Although we did not use deception in this study, it is very important for us to know if you felt suspicious about the study at all, as this may affect your answers.

Participants then reported what they thought the purpose of the study to be, and to what extent they thought the study seemed suspicious on a 1 (*Not at all*) to 5 (*Extremely*) scale.

Participants who responded with a 4 or 5 on the suspicion scale and/or specifically mentioned feeling suspicious about the video's authenticity were eliminated from analyses ($n = 18$).

Prosocial motivation. On the final page of the electronic survey, participants were told to open a manila envelope on their desk, which contained a letter and a short form to fill out. The

letter read that the student in the video, Sarah, was still having difficulties keeping up with her work, and the researcher wanted to give participants the opportunity to help Sarah out if they wanted by photocopying notes for her from note-takers in her classes. Participants were asked to fill out the form to indicate if they would like to volunteer to help, first circling “yes” or no, then writing how many hours they would like to help out over the course of the semester. After completing this form and returning it to the envelope, participants left the computer lab and were debriefed by a research assistant.

Study 2 Results

Preliminary Analyses

First, because the exclusion of suspicious participants left the study slightly underpowered, I checked to see whether there were any significant differences between suspicious and non-suspicious students in terms of their state reported curiosity, empathic concern, personal distress, and follow-up question type. An independent samples t-test indicated that participants who indicated suspicion reported less state empathic concern after watching the video ($M = 6.38$, $SD = 1.93$) than those who did not report any suspicion ($M = 7.09$, $SD = 1.30$), $t(106) = 1.96$, $p = .05$. In addition, participants who indicated suspicion reported less desire to learn more about how well Sarah was doing ($M = 5.00$, $SD = 2.11$) than those who did not report any suspicion ($M = 5.92$, $SD = 1.25$), $t(106) = 2.55$, $p = .01$. Participants reporting suspicion also reported significantly less desire to learn more about Sarah’s background and personality ($M = 3.47$, $SD = 1.42$) than non-suspicious participants, ($M = 4.74$, $SD = 1.48$), $t(106) = 3.41$, $p = .001$. There were no differences between suspicious/non-suspicious participants with regard to state curiosity prior to the video (manipulation check curiosity), post-video state curiosity, or desire to learn more about Sarah’s disease (p ’s $> .08$). Because of these differences, I opted to keep the

suspicious participants out of subsequent analyses in order to better show how curiosity affects authentic feelings of empathic concern or distress.

All measures were checked for assumptions of univariate and multivariate normality, heteroscedasticity, and independence. All measures met this assumption with the exception of the two state and trait empathic concern measures. Winsorizing an outlier in each measure corrected this issue.⁵ No variables were centered except the pre-video state curiosity and attachment anxiety variables before they were used in a moderation analysis. Descriptive statistics are listed in Table 8 and correlation coefficients are presented in Table 9.

Manipulation check. To determine whether the curiosity manipulation had the intended effect of increased curiosity, I performed an independent-samples t-test between the high and low curiosity conditions for participants' mean state curiosity manipulation check answers. Despite the significant difference between conditions in the pilot test, there was no reliable difference between the two conditions in the study sample, $t(87) = 1.36, p = .17$; however, the mean manipulation check scores in each condition were in the predicted direction ($M_{high} = 3.01, SD_{high} = .74; M_{low} = 2.78, SD_{low} = .82$).

Hypothesis Tests: Effects of Curiosity Condition on Empathic Concern and Personal Distress

Hypothesis 2 predicted that experimentally-manipulated changes in state curiosity would predict greater empathic concern for a peer going through hardship. However, I was unable to identify a meaningful difference in how participant's reported their state curiosity following each

⁵ Trait EC had an outlier of 8 ($Z = -4.36$) and had very high kurtosis ($g_2 = 2.87$). State EC had an outlier of 1 ($Z = -4.69$) and was also skewed ($g_1 = -1.21$) and kurtotic ($g_2 = 4.05$). These scores were winsorized to become one unit value higher than the next-lowest score in the dataset (raw scores 16.00 and 3.83, respectively). This brought the kurtosis and skewness into acceptable ranges ($g_{2\text{ trait}} = -.21; g_{1\text{ state}} = -.35, g_{2\text{ state}} = -.47$). No other transformations were necessary.

type of manipulation. To further check whether the curiosity manipulation had any relationship with later dependent variables, I performed independent samples t-tests of the mean scores in each condition of state empathic concern, state personal distress, post-video state curiosity, and independently-rated warmth, curiosity, and interpersonal focus, and willingness to help (see Table 10). All mean differences between conditions were nonsignificant. However, to account for any random effects of curiosity manipulation condition on the dependent variables, I conducted exploratory analyses with pre-video state curiosity as the independent variable and statistically controlled for experimental condition in hierarchical regression analyses.

Hypothesis Tests: State Curiosity Effects on Responses to the Interview Video

As indicated by zero-order correlations, pre-video state curiosity was positively correlated with state and trait empathic concern. A hierarchical linear regression of manipulation-check state curiosity on post-video empathic concern controlling for experimental condition indicated that state curiosity right before the interview video was indeed a significant, positive predictor of feelings of empathic concern during the video, $F(2, 86) = 17.81, p < .001, R^2 = .29, \beta = .54$. In contrast, pre-video curiosity did not significantly predict feelings of personal distress, $F(2, 86) = .71, p = .27, R^2 = .02, \beta = .13$. Overall, participants who reported greater state curiosity also reported greater compassionate concern for Sarah, but were no more or less likely to report self-oriented feelings of distress.

State curiosity similarly was related to higher trait empathic concern, $F(2, 86) = 27.01, p < .001, R^2 = .39, \beta = .62$, and unrelated to trait personal distress, $F(2, 86) = .18, p = .84, \beta = -.06$. However, because participants responded to the IRI after watching the video (so as to not interfere with state empathic concern, of more interest) it is possible that state curiosity also affected participants' self-perceptions of their tendency to feel concerned about others.

Table 8.

Means and Standard Deviations of Study 2 Variables

Predictor	M	SD	α
CEI- total	3.36	0.70	.87
CEI - stretching	3.63	0.61	.80
CEI - embracing	3.07	0.76	.76
SCS - general	3.11	0.55	.85
SCS - covert	2.45	0.65	.73
MAAS	3.72	0.88	.89
ECR-Anx	3.57	0.98	.95
ECR-Avd	3.89	0.45	.91
BIS	21.85	3.81	.77
BAS-FS	12.21	2.24	.64
BAS-R	18.05	1.55	.65
BAS-D	11.57	2.61	.80
CMC	2.91	0.78	.95
EC-S	7.11	1.18	.87
PD-S	5.17	1.68	.88
MCI - S	2.68	0.68	.96
HV	2.98	4.59	---
IRI - EC	27.6	4.15	.84
IRI - PD	19.2	5.08	.80

Note . CEI-total: Curiosity and Exploration Inventory II (CEI-II) scale total score; CEI-stretching: Stretching scale of the CEI-II; CEI-embracing: Embracing subscale of the CEI-II; SCS - general: General subscale of the Social Curiosity Scale (SCS); SCS - covert: Covert subscale of the SCS; MAAS: Mindful Attention and Awareness Scale; BIS: Behavioral Inhibition System; BAS-D: Behavioral Activation System (BAS) Drive; BAS-F: BAS Fun Seeking; BAS-R: BAS Reward Responsiveness; CMC: State curiosity manipulation check mean; EC-S: State empathic concern; PD-S: State personal distress; MCIS: Melbourne State Curiosity Inventory - State; HV: Hours volunteered; Av: Avoidance subscale of the Experiences in Close Relationships- Revised adult attachment scale (ECR-R); Ax: Anxiety subscale of the ECR-R. IRI-EC: Empathic Concern subscale of the Interpersonal Reactivity Index (IRI); IRI-PD: Personal Distress subscale of the IRI.

Table 9.

Correlations among Study 2 Variables

	CEI	CEI-S	CEI-E	EC-T	PD-T	SCS-G	SCS-C	BIS	BAS-D	BAS-F	BAS-R	MAAS	CMC	EC-S	PD-S	MCIS	HV	ECR-Ax	ECR-Avd
CEI	1.00	.91**	.92**	.35**	-.30**	.45**	.25*	-.10	.30**	.45**	.39**	-.01	.35**	.23*	-.08	.25*	.36**	-.02	.20
CEI-S	.91**	1.00	.68**	.35**	-.32**	.37**	.13	-.14	.26*	.28**	.40**	-.04	.38**	.26*	-.17	.25*	.42**	-.09	.12
CEI-E	.92**	.68**	1.00	.30**	-.24*	.44**	.33**	-.05	.30**	.54**	.31**	-.06	.29**	.16	.02	.20	.25*	.04	.24*
EC-T	.35**	.34**	.30**	1.00	.10	.58**	.28**	.25*	0.07	.29**	.31**	-.18	.62**	.57**	.10	.34**	.18	.09	.43**
PD-T	-.30**	-.32**	-.23*	.10	1.00	.03	.06	.51**	-.09	-.03	-.07	-.27*	-.06	-.04	.25*	-.05	-.23	.28**	.06
SCS-G	.45**	.37**	.44**	.58**	.03	1.00	.63**	.10	.06	.24*	.24*	-.09	.60**	.38**	.06	.39**	.25*	.17	.31**
SCS-C	.25*	-.13	.33**	.28**	.06	.63**	1.00	.27*	.09	.22*	.17	-.19	.34**	.17	.13	.33**	.19	.27*	.31**
BIS	-.10	-.14	-.05	.25*	.51**	.10	.27*	1.00	-.12	0.03	-.04	-.39**	.07	.05	.14	.06	.01	.56**	.26*
BAS-D	.30**	.26*	.30**	.07	-.09	.06	.09	-.12	1.00	.51**	.44**	-.12	.02	.19	-.20	.18	.10	.05	0.07
BAS-F	.45**	.28**	.54**	.29**	-.03	.24*	.22*	.03	.51**	1.00	.53**	-.14	.19	.20	-.10	.18	-.07	.08	.16
BAS-R	.39**	.40**	.31**	.31**	-.07	.24*	0.17	-.04	.44**	.53**	1.00	-.12	.26*	.16	-.10	.33**	.12	-.02	.13
MAAS	-.01	0.04	-.06	-.18	-.27*	-.09	-.19	-.39**	-.12	-.014	.01	1.00	-.13	-.18	-.27*	-.23**	.04	-.34**	.05
CMC	.36**	.38**	.29**	.62**	-.06	.60**	.33**	.07	.02	0.19	.26*	-.13	1.00	.54**	.12	.51**	.30**	.19	.23*
EC-S	.23*	.26*	.16	.57**	-.04	.38**	0.17	.05	.19	0.20	0.16	-.18	.54**	1.00	.27**	.44**	.28*	.14	.22*
PD-S	.08	-.17	.02	.10	.25*	.06	0.13	.14	-.20	-.10	-.10	-.27*	.12	.27**	1.00	.29**	.04	.27**	.11
MCIS	.25*	.25*	0.20	.34**	-.05	.39**	.33**	.06	.18	.18	.32**	-.22*	.51**	.44**	.29**	1.00	.31**	.30**	.18
HV	.36**	.42**	.24*	.18	-.23*	.25*	0.19	.01	.10	-.07	.12	.04	.30**	.28*	.04	.31**	1.00	.15	.03
Anx	-.02	-.09	.04	.09	.28**	.17	.27*	.56**	.05	.08	-.02	-.34**	.19	.14	.27**	.30**	.15	1.00	.20
Avd	.20	.12	.24*	.43**	.06	.31**	.31**	.26*	0.07	.16	.13	.05	.23*	.22*	.11	.18	.03	.20	1.00

Note. For all scales, higher scores are more indicative of extreme responding in the direction of the construct assessed. Significant correlations between curiosity, empathic concern, personal distress, and attachment measures are in bold. CEI: Curiosity and Exploration Inventory II (CEI-II) scale total score; CEI-S: Stretching scale of the CEI-II; CEI-E: Embracing subscale of the CEI-II; EC-T: Empathic Concern subscale of the Interpersonal Reactivity Index (IRI); PD-T: Personal Distress subscale of the IRI; SCS-G: General subscale of the Social Curiosity Scale (SCS); SCS-C: Covert subscale of the SCS; BIS: Behavioral Inhibition System; BAS-D: Behavioral Activation System (BAS) Drive; BAS-F: BAS Fun Seeking; BAS-R: BAS Reward Responsiveness; MAAS: Mindful Attention and Awareness Scale; CMC: State curiosity manipulation check mean; EC-S: State empathic concern; PD-S: State personal distress; MCIS: Melbourne State Curiosity Inventory - State; HV: Hours volunteered; Av: Avoidance subscale of the Experiences in Close Relationships- Revised adult attachment scale (ECR-R); Ax: Anxiety subscale of the ECR-R. * $p < .05$, ** $p < .01$

Table 10.

Mean Differences between High and Low Curiosity Conditions for Dependent Variables

Predictor	High Curiosity Condition		Low Curiosity Condition		Group Differences	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Pre-Video SC	3.01	0.74	2.78	0.82	-1.38	0.17
Post-Video SC	2.67	0.67	2.69	0.70	0.15	0.88
Empathic Concern	7.18	1.31	7.04	0.99	-0.55	0.58
Personal Distress	5.22	1.89	5.08	1.38	-0.39	0.70
Coder Ratings	--	--	--	--	--	--
Sarah-Curious	3.29	1.30	3.24	1.26	-0.18	0.86
Self-Focus	3.87	1.25	4.25	1.04	1.52	0.13
Sarah-Focus	3.57	1.06	3.46	1.19	-0.50	0.65
Warmth	4.23	1.56	4.43	1.68	0.57	0.57
Sympathy	3.93	1.58	4.09	1.64	0.47	0.64
Distress	2.99	1.44	3.21	1.12	0.78	0.44
Volunteer Hours	2.98	4.56	2.99	4.69	0.01	0.99

Note . Pre-Video SC: State curiosity manipulation check; Post-Video SC: State curiosity measured after reporting empathy; Empathic Concern: state empathic concern-related feelings; Personal Distress: state personal distress-related feelings; Sarah-Curious: independently-rated curiosity about Sarah in thought-list task; Self-Focus: independently-rated focus on self in thought-listing task; Warmth: independently-rated social warmth in thought-listing task; Sympathy: independently-rated sympathy in thought-listing task; Distress: independently-rated distress in thought-listing task; Volunteer Hours: number of hours participant volunteered to help Sarah.

A paired-samples t-test indicated this was a statistically significant reduction in curiosity, $t(88) = 2.97, p < .001$. This may have been because post-video curiosity was measured after state empathic concern indices and could have been influenced by participants' reflecting upon their feelings during the interview. Therefore, I used pre-video curiosity as the measure of state curiosity in all subsequent analyses.

State curiosity and empathy effects on willingness to help. I next examined whether pre-video state curiosity predicted willingness to help the confederate in need. A hierarchical regression indicated that pre-video curiosity significantly predicted the number of hours participants indicated they wanted to volunteer to help the confederate, $F(2, 79) = 4.10, p = .02$, $R^2 = .09, \beta = .30$.

Based on prior research on empathy-helping relationships, empathic concern should also be positively related to willingness to help, especially because there was little cost to avoiding help given participants' anonymity with the volunteer form. Supporting this theory, state empathic concern following the video was a significant predictor of number of hours volunteered, $F(2, 79) = 3.37, p = .04, R^2 = .08, \beta = .28$. State personal distress, however, was not a significant predictor of willingness to help, $F(2, 79) = .05, p = .95, \beta = .04$.

Because state curiosity is a significant predictor of both subsequent state empathic concern feelings and the number of hours volunteered to help, I examined whether state empathic concern explained the relationship between pre-video state curiosity and willingness to help the confederate. Curiosity was highly correlated with empathic concern, $r(87) = .54, p < .001$, as well as highly correlated with volunteer hours, $r(80) = .30, p = .01$; additionally, empathic concern was highly correlated with volunteer hours to a similar extent, $r(80) = .28, p = .01$. I conducted a mediational analysis using the bootstrapping approach using Hayes' (2012) PROCESS macro, generating a bootstrap-based confidence interval (95%) for the indirect effect of curiosity on volunteer hours by taking 10,000 samples from the original data set. These estimates were used to calculate estimates of the conditional indirect effect of curiosity on number of hours volunteered through empathic concern. Contrary to expectations, the bootstrap distribution of conditional indirect effects included zero, $b = .53, \{-.07, 1.36\}$ indicating that the mediation path was not significant. In sum, although simple regression analyses suggest that curious participants reported greater empathic concern and willingness to help Sarah, this motivation to help to help may not have been driven specifically by empathic concern (see Figure 8). When both empathic concern and curiosity were accounted for in predicting number of hours volunteered in the model, both predictors became nonsignificant. This may suggest that curiosity is too highly related with

empathic concern to indicate that empathic concern, and not curiosity directly, accounts for greater willingness to help.

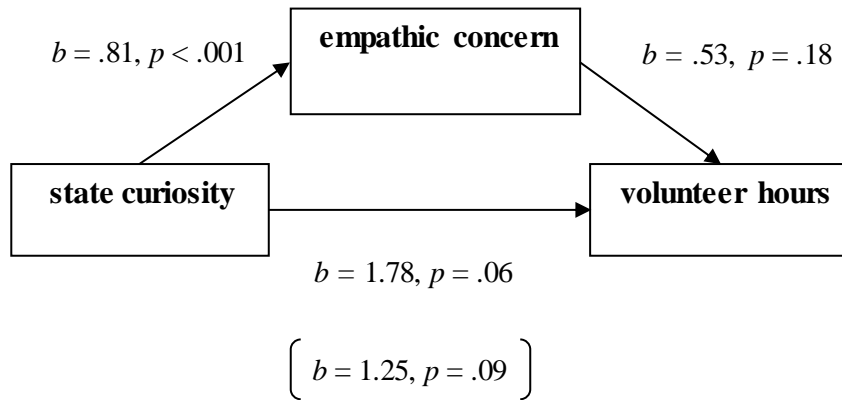


Figure 8. Mediation pathway of curiosity effects on helping by empathic concern.

State curiosity effects on empathic concern when controlling for mindfulness.

Because BIS/BAS sensitivity, openness, and agreeableness are traits which likely facilitate curiosity, it is understandable that they would account for much of the influence of curiosity on empathy, as much of that effect is their covariance with curiosity. For that reason, I focused primarily on investigating mindfulness as a control variable against which to test the relationship between state curiosity and empathy. Mindfulness has been shown to be largely unrelated to curiosity, despite theoretically promoting a curious perspective on one's present-oriented surroundings (Kashdan et al., 2011; Bishop et al. 2004). Thus, to further investigate how mindfulness might account for part of the curiosity-empathy relationship, hierarchical regression analyses were conducted. Mindfulness did not account for a significant amount of variance (when controlling for curiosity condition), $F(2,86) = 1.48, p = .23, R^2 = .03, \beta = .05$. When pre-video state curiosity was entered into the model, it significantly improved the model fit, $R^2\Delta = .27, \Delta F(1, 85) = 33.09, p < .001, \beta = .53$, and the final model was also significant, $F(3, 85) = 12.38, p$

$< .001$, $R^2 = .30$. This suggests that curiosity promotes empathic concern over and above the effects of mindfulness.

State curiosity on thought-listing warmth and sympathy. Another way of identifying empathic concern and social warmth is through a semantic coding of participants' thoughts listed at the end of the survey. Two raters who were blind to participant condition assessed each participant's thought list paragraph and rated the following questions on a 1 (*Not at all*) to 7 (*Very much so*) scale:

- How curious/interested in Sarah were they?
- How much did they seem to focus on themselves?
- How much did they seem to focus on Sarah?
- How warm did the participant seem?
- How sympathetic did the participant seem?
- How distressed did the participant seem?

The two raters were trained to respond consistently by coding the responses from 10 participants who had been removed from analyses due to suspicion. Then, the raters coded the full participant dataset separately. Rater responses were averaged with each other to resolve inconsistencies. A two-way random coefficient intraclass correlation (Shrout & Fleiss, 1979) was computed between the two rater's responses for each question and participant which indicated high inter-rater reliability, $ICC(2, 4) = .80$. Linear regression analyses were conducted to assess the effects of pre-video state curiosity on the mean ratings of the aforementioned questions. State curiosity was found to only marginally predict greater warmth, $F(2, 84) = 2.40$, $p = .10$, $R^2 = .05$, $\beta = .23$, and sympathy, $F(2, 84) = 2.33$, $p = .10$, $R^2 = .05$, $\beta = .23$. All other questions were unrelated to state curiosity (see Table 11).

Table 11.

Mean of Coder Semantic Ratings of Participant Thoughts During Video

Predictor	M	SD	<i>r</i> (with state curiosity)
Sarah-Curious	3.26	1.28	0.16
Self-Focus	4.03	1.18	-0.03
Sarah-Focus	3.52	1.11	0.05
Warmth	4.32	1.60	0.21*
Sympathy	4.00	1.60	0.21*
Distress	3.09	1.30	0.16

Note. Sarah-Curious: independently-rated curiosity about Sarah in thought-list task; Self-Focus: independently-rated focus on self in thought-listing task; Warmth: independently-rated social warmth in thought-listing task; Sympathy: independently-rated sympathy in thought-listing task; Distress: independently-rated distress in thought-listing task; Volunteer Hours: number of hours participant volunteered to help Sarah. $p^* \leq .05$

Attachment effects on curiosity, empathy, and helping. Finally, I examined how attachment was related to state empathic concern, personal distress, and willingness to help. Anxious attachment insecurity positively predicted state pre-video curiosity, $F(2, 86) = 3.25, p = .04, R^2 = .07, \beta = .18$, and avoidance also positively predicted state curiosity, $F(2, 86) = 3.46, p = .04, R^2 = .07, \beta = .23$. Similarly to Study 1, attachment anxiety was unrelated to empathic concern, $F(2, 86) = 1.14, p = .32, \beta = .15$. On the other hand, attachment avoidance positively but marginally predicted compassionate concern toward Sarah after the video, $F(2, 86) = 2.38, p = .10, R^2 = .05, \beta = .22$. Study 2 results also partially replicated the Study 1 results of personal distress: attachment anxiety positively predicted state personal distress, $F(2, 86) = 3.86, p = .03, R^2 = .08, \beta = .29$. However, attachment avoidance was unrelated to distress self-reports, $F(2, 86) = .58, p = .57, \beta = .11$.

I also assessed whether attachment anxiety again moderated the effects of state curiosity on empathic concern, similarly to trait curiosity effects in Study 1. I constructed centered variables of participants' pre-video state curiosity and attachment anxiety as well as a curiosity*attachment anxiety interaction term. Hierarchical regression analyses indicated that

state curiosity significantly predicted empathic concern, $\beta = .55$, $t(88) = 5.89$, $p < .001$.

Attachment anxiety did not significantly predict empathic concern when controlling for curiosity, $\beta = .03$, $t(88) = .27$, $p = .79$. The curiosity*attachment anxiety interaction also was nonsignificant, $\beta = .10$, $t(88) = 1.13$, $p = .26$. These results indicate that the attachment anxiety moderation effect on trait curiosity and trait empathic concern did not replicate for state curiosity and state empathic concern.

I also examined whether attachment anxiety moderated the effects of state curiosity before the video on personal distress felt during the video. Hierarchical regressions controlling found that curiosity did not significantly predict personal distress when entered in a model with attachment anxiety, $\beta = .03$, $t(84) = .30$, $p = .76$. Attachment anxiety did predict a significant amount of variance in personal distress when controlling for curiosity, $\beta = .29$, $t(84) = 2.73$, $p = .01$. The interaction term for attachment anxiety and curiosity on personal distress was marginally significant, $\beta = -.19$, $t(84) = -1.81$, $p = .07$. Next, simple slopes were calculated for the relationship between curiosity and personal distress at low (-1 SD below the mean), moderate (mean) and high (+1 SD above the mean) levels of attachment anxiety. These analyses indicated that those low in attachment anxiety showed a marginally significant positive relationship between state curiosity and personal distress, $b = .46$, $SE = .28$, $p = .10$. In contrast there was no significant relationship between state curiosity and personal distress at moderate, $b = .10$, $SE = .28$, $p = .65$, or high levels of attachment anxiety, $b = -.26$, $SE = .33$, $p = .43$. This suggests that Hypothesis 3d is partially replicated in Study 2: rather than greater attachment levels predicting less significant curiosity-empathic concern relationships, we see that individuals who report higher attachment anxiety show no relationship between curiosity and personal distress. However in contrast to my prediction, low attachment anxiety promoted a marginally significant positive

relationship between curiosity and personal distress, rather than a negative relationship (see Figure 9).

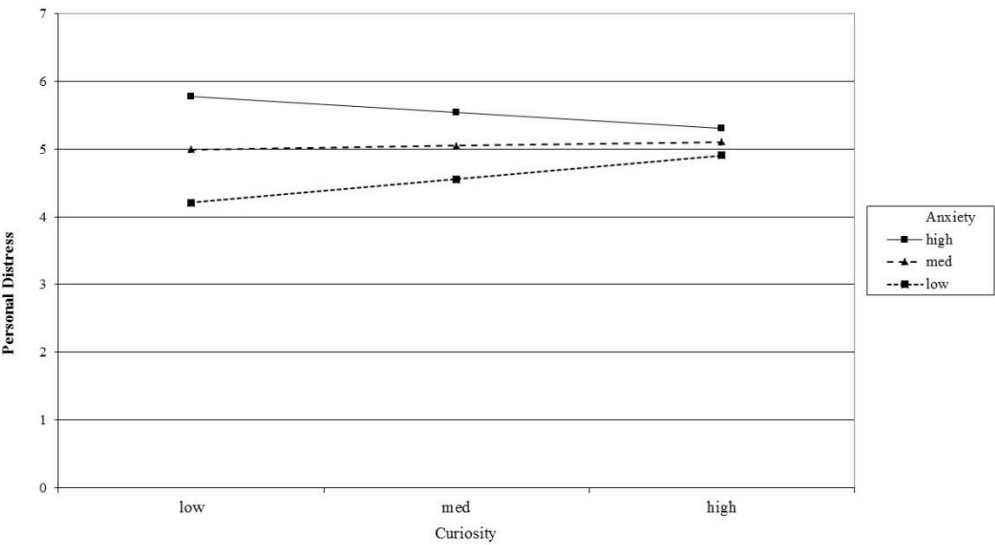


Figure 9. Moderation effects of anxious attachment insecurity on the relationship between state curiosity and personal distress.

Study 2 Discussion

Study 2 attempted to provide evidence that experimentally-induced curiosity would promote empathic concern and predict decreased personal distress. The attempted curiosity manipulation was unsuccessful in eliciting a significant difference in curiosity between conditions. However, participants’ self-reported feelings of curiosity preceding the interview video did show the predicted positive relationship with reported feelings of empathic concern while watching the video. In contrast, pre-video state curiosity was unrelated to state feelings of personal distress for the confederate in the interview video, though trait indices of curiosity were again negatively correlated with trait personal distress.

The finding that the curiosity manipulation was unsuccessful may speak to the difficulty of reliably inducing people to feel strong or weak interest in a particular person or topic. In the literature on curiosity, there have been very few experimental tasks or sets of stimuli that have

been suggested to influence curiosity, and there have been few direct attempts to manipulate curiosity experimentally. Some studies have exposed participants to shapes and figures of varying complexity and novelty, finding that generally greater complexity is quadratically related to curiosity, but that these measures are often not very generalizable (Kashdan & Fincham, 2005). This difficulty in reliability inducing curiosity may be in large part due to the nature of curiosity as an “information gap” or inconsistency which promotes a drive to reconcile that gap in knowledge (Loewenstein, 1994). Because every individual has different reference point for information, manipulating information about a person or stimulus is likely to have different effects on different people, unless the stimulus is a fundamentally unique and novel object. For instance, one aspect of my curiosity manipulation was changing whether Sarah had a common pair of majors (History and English) as opposed to a less common pair of majors (Physics and English). One source of variance that would have been difficult to control for might have been how intrinsically interesting participants find Physics, English, or History subjects, or to what extent they have experience with individuals who are in any combination of those majors. Therefore, observing state curiosity (either through self-report methods, or through a dependent measure of interest and curiosity) may be the most effective way of measuring the effects of curiosity as opposed to trying to induce it. However, given the seeming benefit of curiosity on empathic concern, further research should continue to investigate ways that curiosity may be increased in social situations.

Feelings of curiosity were also found to have beneficial effects on prosocial motivation to help a peer experiencing distress and hardship: participants’ reported state curiosity significantly predicted the number of hours they were willing to volunteer to help make copies for Sarah while she was in the hospital. However, this relationship was not significantly mediated by curiosity’s positive relationship with empathic concern, suggesting that curiosity may not be directly causing

an increase in empathic concern but rather simply covaries with it. In addition, state curiosity was also shown to predict an indirect measure of compassion, the thought-listing task. Participants' self-reported curiosity weakly but positively predicted observer-coded ratings of participant warmth and sympathy in their thoughts during the task. This further supports the central thesis that interest and curiosity about another person are strongly related to compassionate responding. Interest and curiosity do seem to at least correlate with, if not facilitate, the strength of compassionate responding to another's suffering. However, given the lack of experimental manipulation, there is a strong possibility that empathic concern motivates a greater curiosity for others' well-being rather than the opposite effect.

Study 2 also replicated some of the effects of attachment insecurity on the relationship between curiosity and empathic concern. Self-reported attachment anxiety and avoidance significantly predicted curiosity in a positive and negative direction, respectively. Because attachment anxiety had only been found to be significantly related to covert social curiosity in Study 1, the significant relationship between anxiety and state curiosity is notable. This finding replicates prior evidence that individuals high in attachment anxiety utilize curiosity and exploration motives in services of maintaining or seeking out new relationships, whereas avoidant individuals are usually more curious and exploratory when it allows them to avoid social interactions (Hazan & Shaver, 1990; Mikulincer, 1997).

In contrast to the findings of Study 1, attachment anxiety did not moderate the state curiosity and empathic concern relationship. However, attachment anxiety did marginally moderate the relationship between state curiosity and personal distress feelings during the interview video. Among those low in attachment anxiety, there was actually a marginally-significant positive relationship between state curiosity and personal distress. Among those moderate or high in attachment anxiety, there was no relationship between curiosity and distress.

These moderation findings are somewhat contradictory to expectations. Although trait stretching curiosity negatively predicted distress, it could be that state curiosity promotes somewhat more personal distress among those low in attachment anxiety because greater curiosity may promote more focus on the other person's situation. Those who have low attachment anxiety may be less likely to feel anxious and distressed in social situations in general, so the curiosity-personal distress relationship may be due to a stronger emotional reaction overall to Sarah's predicament. However, these findings are still somewhat contradictory to prior research suggesting curiosity is a psychological trait orthogonal to anxiety (Kashdan & Roberts, 2006) such that curiosity buffers against anxiety and vice-versa. One other consideration is the ceiling effect found for empathic concern: the mean state empathic concern response to the video was 7.11 out of a 9-point scale. Personal distress and empathic concern responses were highly correlated, so the moderation effects for personal distress might also be evident for empathic concern in a situation where the victim's distress was less overt.

One potential issue of Study 2 is that it is slightly underpowered. The power analysis required 96 participants to detect effects with .80 power at an alpha level of .05. Although my sample size was close to this ($N = 89$), the elimination of some participants due to missing data potentially may have caused issues for the mediation and moderation analyses. It would be of use to identify whether the nonsignificant mediation effects and nonsignificant difference between the curiosity manipulation conditions are due to insufficient sample size by collecting approximately 20 more participants in the future.

Another potential limitation of Study 2 is the possibility that the interview video was by its nature attention-grabbing and sympathy-inducing enough to wipe out any effects of the curiosity manipulation. Participants, who were young adult undergraduate students, may not have had much experience with peers who are experiencing chronic, possibly terminal illnesses.

Additionally, although participants in the low-curiosity condition were told the participant had a “common” medical condition, this assumption was violated (as Hodgkin’s Lymphoma is not very common) which could have increased curiosity while watching the video. One improvement for a follow-up study might be to identify an illness that is less uncommon among undergraduate students. Additionally, because the confederate’s story also elicited very high self-reported empathic concern across all participants, these ceiling effects could have potentially affected the mediation analyses of curiosity effects on prosocial motivation by empathic concern.

In conclusion, Study 2 provided support that curiosity for other people is an important factor promoting compassionate responding and can also predict willingness to help. These findings are qualified by the inability to create an effective experimental manipulation of curiosity, which would have allowed for a more controlled, internally-valid test of my hypotheses. Despite this setback, the correlational results generally support Hypotheses 2 and 3a through 3d.

General Discussion

Feeling empathy for others is a fundamental aspect of communication and relational support, and often in our daily lives we encounter situations where empathy “just happens” without our knowing it or controlling it (Hodges & Wegner, 1997, p. 311). Other times, we may encounter social barriers to empathy, such as outgroup distinctions or feelings of power or social distance. The two studies presented here suggest that one way to promote empathic responding across situations may be to foster curiosity for others and for one’s day-to-day experiences. Curiosity’s motivation to focus on novel information may promote other-focused attention and motivation, which in turn seems to promote stronger care for the other’s well-being, a critical component of the empathy-altruism relationship (Batson et al., 2007).

However, curiosity effects on empathic concern were largely subsumed by behavioral approach and avoidance motivation, as well as personality traits promoting openness and

agreeableness. This suggests that the primary mechanism by which curiosity influenced empathic concern was through this motivation to approach and engage with a person in pain rather than withdraw and focus on one's own distress or self-interests. Further research will investigate whether this effect might also be due to a shift in the quality of perspective-taking when an individual tries to understand and picture what another is going through. Batson et al. (1997) demonstrated that adopting a perspective-taking stance which implicitly projects one's own perspective into another person's situation promotes less empathic concern and more self-focused distress than adopting a perspective-taking process which tried to adopt the unique perspective of the other person. Further research will identify whether greater curiosity promotes one type of perspective-taking over another.

Additionally, further research will investigate whether being curious about another person leads to caring more about their welfare specifically, along with stronger feelings of compassion. In particular, a future study could identify whether fostering curiosity about a less-known outgroup can promote curiosity. Intergroup contact theory (Pettigrew, 1998) suggests that two optimal ways to promote interaction between groups who have high prejudice for one another are to increase knowledge about the other group and to increase affective ties. As we have found in these studies, being exposed to new knowledge about the group may create these affective ties by promoting curiosity about another social group. However, learning about an outgroup would need to be done in such a way that reduces anxiety and threat, as the effects of curiosity on empathy are moderated by feelings of attachment anxiety.

These studies suffered from several limitations. Because of the manipulation failure, both studies eventually became primarily correlation studies. This means we cannot rule out the fact that curiosity's correlation with empathic concern could be accounted for by a third variable such as increased attention paid to the confederate's story in the video. Additionally, although

participants were asked twice at the end of the electronic survey if they were suspicious of anything, it could be that participants either fail to answer, or misremember actually feeling suspicious in retrospect. If more participants in the sample believed that curiosity was *meant* to relate to empathic concern, then these results could be due to task demands of the study. I sought to decrease this possibility by including several filler questions which were not analyzed, such as “I thought Sarah was typical of other students at VCU” in order to support the cover story.

This study also would benefit from a conceptual replication in a situation where helping is more costly to students. I measured willingness to volunteer to help make and deliver notes to a VCU office in the Commons as the operationalization of helpfulness, which would probably not be difficult for most non-commuting students. I still had high variability in the number of hours volunteered, but it would be interesting to research further whether increased curiosity promotes altruistic motivation to help via empathic concern specifically, compared to a more self-serving motivation to help.

In conclusion, these studies are some of the first to provide evidence in support of curiosity’s positive relationship with empathic concern. Although future research is needed to investigate this link, it seems likely that one useful method of promoting empathy for marginalized others or those from outgroups may be to foster curiosity for the similar, or unexpected, aspects of members in each group.

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Appendix A

Curiosity Induction

Before watching the interview, all participants read the following:

Thank you for your participation!

The second study we will ask you to take part in is part of an ongoing project to increase VCU Counseling Psychology students' effectiveness in counseling by focusing on different aspects of the interview session.

In this study, we will ask you to watch a short video and then respond to a few questions about your reactions to the video. The video shows a short interview with another VCU student. This student was recruited from the general VCU population and did not come to University Counseling Services for counseling.

Before you watch the video, here is some information about the student being interviewed. You will have two minutes to read the following information before moving on to the video.

Participants then read the following information about the student before moving on to the manipulation check questions:

(High curiosity condition)

- Name: Sarah
- Physics/English double major
- Unexpected life event occurred recently
- Has an uncommon medical condition

(Low curiosity condition)

- Name: Sarah
- History/English double major
- Unexpectedly moved from Newport News to Fredericksburg, VA recently
- Has a common medical condition

Appendix B

Cancer Patient Interview Script (adapted from Westmaas & Silver, 2001)

I = Interviewer

S = student with cancer (Sarah)

I: Hi Sarah, thanks for coming in today to talk with us. How are you doing?

S: Not bad, and no problem.

I: Great to hear. Now, I'm just going to spend a few minutes asking you some questions about your background and your recent experiences. Please remember that we are videotaping this interview, and you will have the opportunity at the end of our session to retract your video data. Please also remember that you do not have to answer any questions that you do not wish to answer. Do you have any questions before we continue?

S: Nope, that all sounds good.

I: Great, thanks! Ok, so first question: what year in school are you?

S: I'm a sophomore; I started August of last year.

I: Cool! Ok, next question- what kind of hobbies do you have? Or what do you like to do in your spare time?

S: Well, normal stuff I guess. I love sports, so I play Ultimate Frisbee with some friends on the weekends pretty often. I like to travel to go to the beach or hiking a lot. But I'm also kind of lazy- I really love just watching Netflix after getting off class or work as a way to unwind too.

I: That's great to hear you have a nice range of hobbies! Ok, so here's an easy question- where is your hometown?

S: Like where was I born, or where did I come from before VCU?

I: Lived before VCU.

S: Ah, okay. I used to live up in Fredericksburg. A little bit north of Richmond.

I: Cool, so it's not a long drive home for you?

S: Yeah, ha ha. It's nice most of the time; I have family visiting me a fair amount recently so it's good they don't have to come too far. I was originally thinking of going to a school farther away, in North Carolina, actually. But I'm glad I ended up here in Richmond.

I: That's good, I'm glad you're happy here too! So actually speaking of your family, the next questions are related to them. Do you have any brothers or sisters?

S: Yeah, I have a sister and a brother.

I: Are they older or younger than you?

S: Oh yeah- my brother is older, my sister is a little bit younger.

I: Do either of them attend VCU or are maybe thinking about attending?

S: No, my brother went to Duquesne in Pittsburgh, and my sister is still looking at colleges. She's in 11th grade right now. I think she's interested in schools outside Virginia, but I've also heard her say she might try to take a gap year or two before college.

I: Ok, thanks. Now we were also wondering about your parents- what do they do?

S: My dad works at the bank- Capitol One. My mom is a history teacher at a high school in Fredericksburg.

I: Ok, great, thanks. Now we have a few questions about you and your personal experiences since you started college. Since you started college, what do you think has been the most significant life event to happen to you?

S: Oh, okay... well... I guess something has happened that's pretty big. About a month ago I was actually diagnosed with Hodgkin's Disease.

I: If I might ask, what type of disease is that?

S: It's a type of cancer... it basically attacks my lymph nodes.

I: I'm so sorry to hear that. Do you mind telling us a little more about that experience? How did you come to find out you had cancer?

S: Uh, well about three weeks ago I started feeling like I had the flu. I missed my classes for like a week. I had the worst chills, night sweats, and fever, and it didn't go away for over a week, but I wasn't nauseous or anything. Just really achy and tired, like my body was just shutting down. I thought it might be something weird like mono... I never thought it would be something this crazy.

So I went to the doctor and they felt the nodes on my neck were like, super enlarged. Then they took me and did an MRI and found some small tumors. They said I'll need to start chemo soon, and then after that round they'll see if they need to do surgery. Luckily that's not for certain yet, whether I'll need surgery. They said I could finish out the semester since it's so close to the end of the semester, and I don't want to lose all the money I already spent on tuition.

I: I can imagine that must be very difficult for you... (*Sarah nods*). If you don't mind me asking, how often do you think about that experience in your day-to-day life?

S: I definitely think about it a lot. I'm starting the chemo treatment in a few weeks, and I worry a lot about how that's going to go. The doctors told me it will be rough—I'll be really sick to my stomach almost every day and have trouble keeping food down. They have medicine to help that, though. I'll still feel

really tired and ache a lot, so I guess I won't feel better from the treatment until I actually stop chemo too. And then there's the hair... I'm really upset about having to lose my hair.

I: Ok, thanks... you've already kind of touched on this, but how do you think this experience will affect how you act in the future?

S: Haha, yeah, well I guess I already mentioned having to start chemo soon. So I'm mentally prepping for that. Like I've picked out a bunch of books to read during the treatment sessions. But I do feel really sad and scared... for one thing like I said I'm really sad about having to lose my hair. I hate to sound shallow about it, but I really love how long I've been able to get it. But, I've been planning to go to a hair charity and donate my hair before it falls out.

But also I think the main thing I've been thinking about is how to prepare for dealing with the illness... I've seen how chemo looks on a bunch of TV shows, like House, and it always looked so painful... I just haven't ever gone through anything like that before. I'm not sure how I'm going to deal with the pain.

I: What do you plan to do to cope with this experience? Your worries about the pain, and losing your hair?

S: Well, I've talked with my family and friends about it a lot. I'm going to start seeing a therapist, since the doctors recommended that. Otherwise I'm not sure what to do other than reach out to my family and friends, try to keep being positive about it, and maybe try to distract myself from bad thoughts as much as possible.

I: Thanks. I think those are great ideas, and it sounds like you're taking a really positive, healthy mindset toward this. Do you have anything else you want to talk about related to that experience? Or your experiences at VCU so far in general?

S: No, I think that's about everything I was thinking about. I'm kind of tired, too, so if it's ok I wouldn't mind moving on to the next part of the study if that's all the questions you have.

I: Sure, that sounds great. Thanks again for your cooperation in doing this interview.

Appendix C

Curiosity and Exploration Inventory (CEI-II; Kashdan, 2009)

1. I actively seek as much information as I can in new situations.

- 1 = very slightly or not at all
- 2 = a little
- 3 = moderately
- 4 = quite a bit
- 5 = extremely

2. I am the type of person who really enjoys the uncertainty of everyday life.

- 1 = very slightly or not at all
- 2 = a little
- 3 = moderately
- 4 = quite a bit
- 5 = extremely

3. I am at my best when doing something that is complex or challenging.

- 1 = very slightly or not at all
- 2 = a little
- 3 = moderately
- 4 = quite a bit
- 5 = extremely

4. Everywhere I go, I am out looking for new things and experiences.

- 1 = very slightly or not at all
- 2 = a little
- 3 = moderately
- 4 = quite a bit
- 5 = extremely

5. I view challenging situations as an opportunity to grow and learn.

- 1 = very slightly or not at all
- 2 = a little
- 3 = moderately
- 4 = quite a bit

5 = extremely

6. I like to do things that are a little frightening.

1 = very slightly or not at all

2 = a little

3 = moderately

4 = quite a bit

5 = extremely

7. I am always looking for experiences to challenge how I think about myself and the world.

1 = very slightly or not at all

2 = a little

3 = moderately

4 = quite a bit

5 = extremely

8. I prefer jobs that are excitingly unpredictable.

1 = very slightly or not at all

2 = a little

3 = moderately

4 = quite a bit

5 = extremely

9. I frequently seek out opportunities to challenge myself and grow as a person.

1 = very slightly or not at all

2 = a little

3 = moderately

4 = quite a bit

5 = extremely

10. I am the kind of person who embraces unfamiliar people, events, and places.

1 = very slightly or not at all

2 = a little

3 = moderately

4 = quite a bit

5 = extremely

Appendix D

Social Curiosity Scale (SCS, Renner, 2006)

1. When I meet a new person, I am interested in learning more about him/her.

1 = strongly disagree

2

3

4 = strongly agree

2. I'm interested in people.

1 = strongly disagree

2

3

4 = strongly agree

3. I find it fascinating to get to know new people.

1 = strongly disagree

2

3

4 = strongly agree

4. I like to learn about the habits of others.

1 = strongly disagree

2

3

4 = strongly agree

5. I like finding out how others "work."

1 = strongly disagree

2

3

4 = strongly agree

6. When other people are having a conversation, I like to find out what it's about.

1 = strongly disagree

2

3

4 = strongly agree

7. When on the train, I like listening to other people's conversations.

1 = strongly disagree

2

3

4 = strongly agree

8. Every so often I like to stand at the window and watch what my neighbors are doing.

1 = strongly disagree

2

3

4 = strongly agree

9. I like to look into other people's lit windows.

1 = strongly disagree

2

3

4 = strongly agree

10. When people quarrel, I like to know what's going on.

1 = strongly disagree

2

3

4 = strongly agree

Appendix E

Experiences in Close Relationships- Revised (ECR-R; Fraley, Waller, & Brennan, 2000)

Directions: The statements below concern how you feel in emotionally intimate relationships. You can use them to assess how you tend to feel in close relationships generally, or you can use them to focus on a particular relationship or type of relationship. Typical examples include your relationship with your current romantic partner, romantic partners in general, your mother, your father, your best friend, or friends in general. With adaptations, the statements are also relevant to therapeutic relationships. Using the 1 to 7 scale, after each statement click the button to indicate how much you agree or disagree with the statement.

(The following scale were under each question)

1 = strongly disagree

7 = strongly agree

1. I'm afraid that I will lose others' love.
2. I prefer not to show other people how I feel deep down.
3. I often worry that others will not want to stay with me.
4. I feel comfortable sharing my private thoughts and feelings with others. (R)
5. I often worry that others don't really like me.
6. I find it difficult to allow myself to depend on others.
7. I worry that others won't care about me as much as I care about them.
8. I am very comfortable being close to others. (R)
9. I often wish that others' feelings for me were as strong as my feelings for them.
10. I don't feel comfortable opening up to other people.
11. I worry a lot about my relationships.
12. I prefer not to be too close to others.
13. When others are out of sight, I worry that they might become interested in someone else and exclude me.
14. I get uncomfortable when other people want to be very close.
15. When I show my feelings for others, I'm afraid they will not feel the same about me
16. I find it relatively easy to get close to other people. (R)
17. I rarely worry about others leaving me. (R)
18. It's not difficult for me to get close to this others. (R)
19. This other people make me doubt myself.
20. I usually discuss my problems and concerns with others. (R)
21. I do not often worry about being abandoned. (R)
22. It helps to turn to other people in times of need. (R)
23. I find that others don't want to get as close as I would like.
24. I tell other people close to me just about everything. (R)
25. Sometimes other people change their feelings about me for no apparent reason.

- 26. I talk things over with this others. (R)
- 27. My desire to be very close sometimes scares others away.
- 28. I am nervous when this others get too close to me.
- 29. I'm afraid that once other people get to know me, they won't like who I really am.
- 30. I feel comfortable depending on others. (R)
- 31. It makes me mad that I don't get the affection and support I need from other people.
- 32. I find it easy to depend on others. (R)
- 33. I worry that I won't measure up to other people.
- 34. It's easy for me to be affectionate with other people. (R)
- 35. Other people only seems to notice me when I'm angry.
- 36. Other people mostly really understand me and my needs. (R)

Appendix F

Mindful Attention and Awareness (MAAS; Brown & Ryan, 2003)

Day-to-Day Experiences

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what *really reflects* your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6
Almost	Very	Somewhat	Somewhat	Very	Almost
Always	Frequently	Frequently	Infrequently	Infrequently	Never

I could be experiencing some emotion and not be conscious of it until some time later. 1 2 3 4 5 6

I break or spill things because of carelessness, not paying attention, or thinking of something else. 1 2 3 4 5 6

I find it difficult to stay focused on what's happening in the present. 1 2 3 4 5 6

I tend to walk quickly to get where I'm going without paying attention to what I experience along the way. 1 2 3 4 5 6

I tend not to notice feelings of physical tension or discomfort until they really grab my attention. 1 2 3 4 5 6

I forget a person's name almost as soon as I've been told it for the first time. 1 2 3 4 5 6

It seems I am "running on automatic," without much awareness of what I'm doing. 1 2 3 4 5 6

I rush through activities without being really attentive to them. 1 2 3 4 5 6

I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there. 1 2 3 4 5 6

I do jobs or tasks automatically, without being aware of what I'm doing. 1 2 3 4 5 6

I find myself listening to someone with one ear, doing something else at the same time. 1 2 3 4 5 6

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

I drive places on 'automatic pilot' and then wonder why I went there. 1 2 3 4 5 6

I find myself preoccupied with the future or the past. 1 2 3 4 5 6

I find myself doing things without paying attention. 1 2 3 4 5 6

I snack without being aware that I'm eating. 1 2 3 4 5 6

Appendix G

Behavioral Inhibition/Activation Scale (BIS/BAS; Carver & White, 1994)

Directions: Each item of this questionnaire is a statement that a person may either agree with or disagree with. For each item, indicate how much you agree or disagree with what the item says. Please respond to all the items; do not leave any blank. Choose only one response to each statement. Please be as accurate and honest as you can be. Respond to each item as if it were the only item. That is, don't worry about being "consistent" in your responses. Choose from the following four response options (*the following scale will be shown after each question*):

- 1 = very true for me
- 2 = somewhat true for me
- 3 = somewhat false for me
- 4 = very false for me

1. A person's family is the most important thing in life.
2. Even if something bad is about to happen to me, I rarely experience fear or nervousness.
3. I go out of my way to get things I want.
4. When I'm doing well at something I love to keep at it.
5. I'm always willing to try something new if I think it will be fun.
6. How I dress is important to me.
7. When I get something I want, I feel excited and energized.
8. Criticism or scolding hurts me quite a bit.
9. When I want something I usually go all-out to get it.
10. I will often do things for no other reason than that they might be fun.
11. It's hard for me to find the time to do things such as get a haircut.
12. If I see a chance to get something I want I move on it right away.
13. I feel pretty worried or upset when I think or know somebody is angry at me.
14. When I see an opportunity for something I like I get excited right away.
15. I often act on the spur of the moment.
16. If I think something unpleasant is going to happen I usually get pretty "worked up."
17. I often wonder why people act the way they do.
18. When good things happen to me, it affects me strongly.
19. I feel worried when I think I have done poorly at something important.
20. I crave excitement and new sensations.
21. When I go after something I use a "no holds barred" approach.
22. I have very few fears compared to my friends.
23. It would excite me to win a contest.
24. I worry about making mistakes.

Appendix H

The Big-Five Inventory (BFI; John & Srivastava, 1999)

How I am in general

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please click the number next to each statement to indicate the extent to which **you agree or disagree with that statement.**

(The following scale will be included with each question)

1
Disagree
Strongly

2
Disagree
a little

3
Neither agree
nor disagree

4
Agree
a little

5
Agree
strongly

I am someone who...

- | | |
|--|---|
| 1. _____ Is talkative | 16. _____ Generates a lot of enthusiasm |
| 2. _____ Tends to find fault with others | 17. _____ Has a forgiving nature |
| 3. _____ Does a thorough job | 18. _____ Tends to be disorganized |
| 4. _____ Is depressed, blue | 19. _____ Worries a lot |
| 5. _____ Is original, comes up with new ideas | 20. _____ Has an active imagination |
| 6. _____ Is reserved | 21. _____ Tends to be quiet |
| 7. _____ Is helpful and unselfish with others | 22. _____ Is generally trusting |
| 8. _____ Can be somewhat careless | 23. _____ Tends to be lazy |
| 9. _____ Is relaxed, handles stress well. | 24. _____ Is emotionally stable, not easily upset |
| 10. _____ Is curious about many different things | 25. _____ Is inventive |
| 11. _____ Is full of energy | 26. _____ Has an assertive personality |
| 12. _____ Starts quarrels with others | 27. _____ Can be cold and aloof |
| 13. _____ Is a reliable worker | 28. _____ Perseveres until the task is finished |
| 14. _____ Can be tense | 29. _____ Can be moody |
| 15. _____ Is ingenious, a deep thinker | |

- 30. _____ Values artistic, aesthetic experiences
- 31. _____ Is sometimes shy, inhibited
- 32. _____ Is considerate and kind to almost everyone
- 33. _____ Does things efficiently
- 34. _____ Remains calm in tense situations
- 35. _____ Prefers work that is routine
- 36. _____ Is outgoing, sociable
- 37. _____ Is sometimes rude to others
- 38. _____ Makes plans and follows through with them
- 39. _____ Gets nervous easily
- 40. _____ Likes to reflect, play with ideas
- 41. _____ Has few artistic interests
- 42. _____ Likes to cooperate with others
- 43. _____ Is easily distracted
- 44. _____ Is sophisticated in art, music, or literature

Appendix I

Interpersonal Reactivity Index (IRI, Davis, 1980)

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate number. When you have decided on your answer, fill in the letter on the answer sheet next to the item number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

ANSWER SCALE (*will be included under each question*):

1	2	3	4	5
DOES NOT				DESCRIBES ME
DESCRIBE ME				VERY
WELL				WELL

1. I daydream and fantasize, with some regularity, about things that might happen to me. (FS)
2. I often have tender, concerned feelings for people less fortunate than me. (EC)
3. I sometimes find it difficult to see things from the "other guy's" point of view. (PT) (-)
4. Sometimes I don't feel very sorry for other people when they are having problems. (EC) (-)
5. I really get involved with the feelings of the characters in a novel. (FS)
6. In emergency situations, I feel apprehensive and ill-at-ease. (PD)
7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it. (FS) (-)
8. I try to look at everybody's side of a disagreement before I make a decision. (PT)
9. When I see someone being taken advantage of, I feel kind of protective towards them. (EC)
10. I sometimes feel helpless when I am in the middle of a very emotional situation. (PD)
11. I sometimes try to understand my friends better by imagining how things look from their

perspective. (PT)

12. Becoming extremely involved in a good book or movie is somewhat rare for me. (FS) (-)
13. When I see someone get hurt, I tend to remain calm. (PD) (-)
14. Other people's misfortunes do not usually disturb me a great deal. (EC) (-)
15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments. (PT) (-)
16. After seeing a play or movie, I have felt as though I were one of the characters. (FS)
17. Being in a tense emotional situation scares me. (PD)
18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them. (EC) (-)
19. I am usually pretty effective in dealing with emergencies. (PD) (-)
20. I am often quite touched by things that I see happen. (EC)
21. I believe that there are two sides to every question and try to look at them both. (PT)
22. I would describe myself as a pretty soft-hearted person. (EC)
23. When I watch a good movie, I can very easily put myself in the place of a leading character. (FS)
24. I tend to lose control during emergencies. (PD)
25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while. (PT)
26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me. (FS)
27. When I see someone who badly needs help in an emergency, I go to pieces. (PD)
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place. (PT)

Appendix J
Demographic Questions

What is your sex? M F

What is your age? _____

What is your race/ethnicity? (If you identify as biracial, you may choose more than one option)

- a. White
- b. Black or African American
- c. American Indian or Alaska Native
- d. Asian Indian
- e. Chinese
- f. Filipino
- g. Japanese
- h. Korean
- i. Vietnamese
- j. Other Asian
- k. Native Hawaiian
- l. Guamanian or Chamorro
- m. Samoan
- n. Other Pacific Islander
- o. Other

If you chose "Other," please specify here _____

Appendix K

Melbourne Curiosity Scale (MCI-S, Naylor, 1981)

Directions: A number of statements which people have used to describe themselves are given below. Read each statement and then choose the appropriate number to the right of the statement to indicate *how you feel right now, that is, at this moment*. There are no right or wrong answers. Do not spend too much time on any statement but give the answer which seems to describe how you feel right now.

1. I want to know more

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

2. I am curious about what is happening.

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

3. I am feeling puzzled

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

4. I want things to make sense

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

5. I am intrigued about what happened in the video

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

6. I want to probe more deeply into things

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

7. I am speculating about what happened

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

8. My curiosity is aroused

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

9. I feel interested in things

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

10. I feel inquisitive

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

11. I feel like asking questions about what happened.

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately

4 = Very much so

12. Things feel incomplete

1 = Not at all

2 = Somewhat

3 = Moderately

4 = Very much so

13. I feel like seeking things out

1 = Not at all

2 = Somewhat

3 = Moderately

4 = Very much so

14. I feel like searching for answers

1 = Not at all

2 = Somewhat

3 = Moderately

4 = Very much so

15. I feel absorbed in what I am doing

1 = Not at all

2 = Somewhat

3 = Moderately

4 = Very much so

16. I want to explore possibilities

1 = Not at all

2 = Somewhat

3 = Moderately

4 = Very much so

17. My interest has been captured

1 = Not at all

2 = Somewhat

3 = Moderately

4 = Very much so

18. I feel involved in what I am doing.

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

19. I want more information

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

20. I want to inquire further

- 1 = Not at all
- 2 = Somewhat
- 3 = Moderately
- 4 = Very much so

Appendix L

Desire for More Information Scales

1. I want to know more about how Sarah is doing currently

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree

2. I want to know more about Sarah's disease

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree

3. I want to know more about Sarah's personality and background

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree

Appendix M

Free-Writing Task (Cacioppo et al., 1997)

We are now interested in everything that went through your mind while watching the interview. Please list these thoughts, whether they were about yourself, the situation, and/or others; whether they were positive, neutral, and/or negative. Any case is fine. Ignore spelling, grammar, and punctuation. You will have 2.5 minutes to write.

(Participants will be given a blank text box in which to write)

Appendix N

Manipulation Check

Thank you for your responses! At this time, you are almost done with the study. However, we have one final question for you. Many psychology studies use deception in order to create realistic scenarios for participants, and sometimes participants come in to a study expecting this deception. Although we did not use deception in this study, it is very important for us to know if you felt suspicious about the study at all, as this may affect your answers.

Please report on the scale below the extent to which you felt any suspicion about any aspect of the study. You will still receive full credit for the study regardless of your answer- we will only use this data as a control variable in our analyses.

1	2	3	4	5
Did not feel suspicious at all about the study		Felt somewhat suspicious but was not sure		Felt very suspicious about the study

What did you think was the purpose of the study? Did anything seem strange or out of place?

Appendix O

Volunteer Form

Dear Participant,

First, we thank you sincerely for taking part in these two studies! We have only one more thing for your consideration. It occurred to us that some of the participants watching Sarah's account might wish to assist her in some way, and so when we contacted Sarah about using her interview tape for our study we asked her if there was anything she needed help with. As she mentioned in the video, she has been trying to complete her academic year and thus has enrolled full-time. However, she is having trouble keeping up with classes due to her illness.

Initially, Sarah was reluctant to ask for help, but because she was confronted with a situation that might involve having to drop out of school, she has let us share this further information with you all.

Specifically, what Sarah needs is some of your time. Sarah can read the assignments for her classes from home, but is having trouble keeping up with several classes whose notes are heavily lecture-based. Due to headaches related to her chemotherapy, she is also finding it difficult to read notes on a computer screen, and so she is reliant on hand-written notes. Students in each of Sarah's five classes have agreed to let the VCU Disabilities Support Service (DSS) Office copy their written notes for her. However, the DSS Office is very short-staffed, and someone is needed to pick up the notes from these students and take them to the DSS office each week.

Thus, your task, if you agree to help, would be to arrange to get the notes, deliver them to the DSS Office, and then return the notes to their owners. Handling the notes should take up to 1-2 hours of your time per week. If you would like to help, please indicate on the scale below how many hours you would like to help over the course of the semester.

To ensure your privacy, if you choose to volunteer we will only collect your contact information as you leave and will keep this information separate from your study data. **Once you have completed the attached form, please fold it into the envelope given to you and leave it at your desk in front of the computer.**

Your participation in this study in no way obligates you to help Sarah – we just want to give you a chance to do so if you wish.

Sincerely,

The PTRO Research Team

Volunteer Form

I would like to volunteer to help Sarah with delivering her notes: Yes No

If yes, please circle how many hours you would like to volunteer over the course of the semester:

1 2 3 4 5 6 7 8 9 10 11 12 Other

If other, specify here: _____

Vita

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